SUPPLEMENT: WALL MAP OF THE WORLD (page 188)

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NATIONAL GEOGRAPHIC

Four-Ocean Navy in the Nuclear Age

Revolutionized by the atom, far-ranging United States forces afloat contribute unprecedented strength to the cause of peace

By THOMAS W. McKNEW

Vice Chairman of the Board of Trustees, National Geographic Society

CIRCLING US in the distance above the Mediterranean, the crippled jet fighter-bomber looked like a one-legged sea gull. In to roost came other planes of the United States Navy's nuclear-powered aircraft carrier *Enterprise*, howling down one by one, mission over. The wait was ending.

Rubber-tired tractors tugged the newly returned planes well away from the angled runway, and in two minutes the flight deck crew raised a nylon barricade across it.

Fire fighters in asbestos suits, foam nozzles in hand, ran to their posts. Men wearing red crosses stood by with wire litters. It was time for the injured Crusader to come home.

14-ton Plane Netted Like a Bird

With Adm. David L. McDonald, then Commander of the Sixth Fleet, I watched from the bridge of this largest and most powerful ship in the world. Now, on the intercom, the captain said, "Bring him in."

We could see the aircraft clearly, approaching *Enterprise* with one wheel dangling. It had been damaged in the catapulted take-off.

I stole a glance at the net stretched across the runway six decks below. How could it possibly stop a 14-ton fighter-bomber?

Suddenly the Crusader roared life-size above the stern, then skimmed low over the flight deck, yawing slightly. The pilot brought her in at normal landing speed—around 150 miles an hour—and flew her straight into the barricade (page 159).

Before our eyes that 21-foot-high maze completely enmeshed the plane, yielded 300 feet, and stopped it dead. An incredibly strong web—thickness after thickness of heavy nylon strips fastened to hydraulically controlled cables—had halted the aircraft in the length of a football field.

And the pilot, uninjured, walked away.

His million-dollar, 1,200-mile-an-hour Chance-Vought Crusader would fly again, too. It sustained only minor wing damage.

This was the nuclear-powered, 100-plane carrier's first barricade engagement, as the Navy calls it, in thousands of plane recoveries. Launch, recovery, launch, recovery—day and night, this is the life cycle of the aircraft carrier. Each launch and each recovery represent the cooperative effort of the entire ship

Catapult steam swirls across the deck of the nuclear aircraft carrier U.S.S. *Enterprise* as crewmen prepare to hurl aloft a North American A-5A Vigilante. The *Enterprise*, world's largest ship, keeps planes in the air around the clock when she cruises the world's oceans as a major weapon of the U.S. Navy.

Above a fireball sun, a Vigilante—the Navy's biggest attack bomber—begins its landing pattern.

Capt. Vincent Paul de Poix, then commanding *Enterprise*, had trained his 4,600 officers and men for this emergency, or any other.

A man's life had, indeed, hung in the balance for a few fearful seconds. But that night, logging the day's events in my journal, I realized that what we had witnessed was more than a dramatic slice of life at sea. This was the four-ocean United States Navy at its best, calmly meeting one more challenge.

It could have been a different challenge, and it could have happened half a world away—in Atlantic, Pacific, Indian, or Arctic Ocean. One such test occurred last August, for example, when North Vietnamese torpedo boats attacked two U.S. destroyers in the Gulf of Tonkin (see the National Geographic Society's new wall map, **The World**, distributed as a supplement to this issue).

But whatever the magnitude of the crisis, the Navy's reaction is the same: swift response, efficiently executed.

Nuclear Task Force Circles the Globe

Two years ago Adm. George W. Anderson, Jr., then Chief of Naval Operations, marked January 17, 1955, as the birth date of our nuclear Navy.* On that day Comdr. Eugene P. Wilkinson, commanding the attack submarine U.S.S. *Nautilus*, flashed his historic message to President Eisenhower:

"Underway on nuclear power."

Today our Navy has 53 nuclear-powered ships in commission besides the giant carrier *Enterprise*. Though mostly submarines, they include the guided-missile cruiser *Long Beach* and the missile frigate *Bainbridge*. The missile frigate *Truxtun* has just been launched.

"Nuclear power marks the greatest advance in propulsion since the steam engine's invention," Admiral McDonald declared to me shortly after his promotion to Chief of Naval Operations, "and of all the armed services it most concerns the Navy. It is essential that we pursue its development."

His words came vividly home to me last June when I flew to the Mediterranean with staff writer Robert P. Jordan to see the world's first all-nuclear-powered surface task force of warships in operation. This unique force, teaming *Enterprise* with *Long Beach* and *Bainbridge*, patrolled the Mediterranean last summer as part of the Sixth Fleet. Then it took the long way home—around Africa, north to Karachi, south around Australia, across the Roaring Forties to Cape Horn, and finally north again to the United States—in a demonstration of high performance and great range (foldout, pages 153-5).

Enterprise, now commanded by Capt. F. H. Michaelis, carries more than 100 aircraft, from the 1,600-mile-an-hour McDonnell Phantom II jet fighters to the venerable Douglas propeller-driven Skyraiders. The offensive and defensive capabilities of "Big E" and her missile ships *Long Beach* and *Bainbridge* give this nuclear-powered task force a perform-

*See "Our Nuclear Navy," by Adm. George W. Anderson, Jr., USN, and "The Mighty *Enterprise*," by Nathaniel T. Kenney, NATIONAL GEOGRAPHIC, March, 1963.

The Author: Thomas W. McKnew (at left) has served the National Geographic Society for more than a third of a century. Executive Vice President and Secretary of the Society until 1962, he now is Vice Chairman of its Board of Trustees. Dr. McKnew holds the Distinguished Public Service Award of the United States Navy.

For this article, he traveled more than 80,000 miles to see our Navy in action throughout the world. Here, aboard the guided-missile cruiser U.S.S. *Providence* in Tokyo Bay, Dr. McKnew talks with Vice Adm. Paul D. Stroop, Commander, Naval Air Force, Pacific Fleet (center), and Adm. Thomas H. Moorer, then Commander of the Seventh Fleet and now Commander in Chief, Pacific Fleet. Gesturing in foreground is Vice Adm. John S. Thach, then Commander, Antisubmarine Warfare Force, Pacific Fleet, and today Deputy Chief of Naval Operations for Air.

Men who guide our global Navy confer at the Pentagon during the tense Gulf of Tonkin incident last summer. Left to right: Gen. Wallace M. Greene, Jr., Marine Corps Commandant; Adm. David L. McDonald, Chief of Naval Operations; and Adm. Horacio Rivero, Jr., Vice CNO. The Navy's far-flung fleets roam Atlantic, Pacific, Indian, and Arctic Oceans, serving as deterrents against the brush fires of international dispute.

ance and flexibility unique in naval history.

Operation Sea Orbit marked the first world cruise of a task force *without refueling or resupplying*. The ships covered 38,732 statute miles in 57 days at sea—averaging an easy 22 knots. Port visits took another eight days. They could just as easily have gone around the world nonstop, as the nuclear submarine *Triton* did four years earlier.*

Seventh of the big *Forrestal* class, Big E is the only carrier propelled by nuclear energy—as yet. The 77,000-ton *America*, just commissioned at the great shipyard at Newport News, Virginia, is powered with oil.

Congress has authorized still another mighty carrier, to be named *John F. Kennedy*. Its construction was held up more than a year while the Department of Defense made extensive cost-effectiveness studies. In the end, the department ruled that building should go ahead, but that the carrier would have conventional "fossil" power, not nuclear.

Thus the *John F. Kennedy*, like its oil-fired sister ship *America*, will not be able to challenge *Enterprise*'s feat of steaming nearly 35,000 miles at an average 22 knots without refueling along the way.

Unfortunately, this ruling has halted, at least temporarily, the Navy's program of nuclear propulsion for major new combat surface ships. Yet in the few years since *Enterprise* was built, with its eight nuclear reactors, the Atomic Energy Commission and

*In the November, 1960, NATIONAL GEOGRAPHIC, Capt. Edward L. Beach, USN, described *Triton*'s history-making cruise around the world submerged.

Exploding from the ocean depths, a Polaris A-3 soars skyward from Florida waters on a flight down the Atlantic Missile Range. The 31-foot bullet-shaped missile, unleashed from the submerged submarine U.S.S. *Daniel Boone*, will demonstrate its remarkable accuracy by striking an instrumented target area far down range.

Today the Navy has commissioned more than two-thirds of a planned fleet of 41 ballistic missile submarines, familiarly called Polaris after the missiles they carry. The entire nuclear-powered force will be operational in 1966. With almost unlimited range and endurance limited only by the crew, nuclear submarines cruise hidden in the ocean, their locations unknown to any potential enemy. And their deadly Polaris missiles, with a range of nearly 3,000 statute miles, can hit any spot on earth.

Aboard the U.S.S. *Andrew Jackson*, submariners monitor control panels adjacent to the 16 missile launchers that they call Sherwood Forest. Each Polaris vessel has two complete crews, the Blue and the Gold, of some 130 men each. Alternating patrols spend nearly two months of radio-silent submersion in assigned areas in both hemispheres.


E=mc2

OPERATION SEA ORBIT: *A nuclear-powered task force led by* **Enterprise** *with the cruiser* **Long Beach** *(9) and frigate* **Bainbridge** *(25), both bristling with missiles, slices through the Mediterranean Sea at the start of a round-the-world cruise in mid-1964. Fifteen hundred seamen aboard the carrier spell out Einstein's famous equation: Energy equals mass times the speed of light squared, the formula that led to man's harnessing of atomic energy.*

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER WINFIELD PARKS © N.G.S.

Now we have developed reactors of much higher efficiency and, with more than double the core life.

Fewer reactors would be needed to supply the same amount of power for a new carrier today, saving tremendous amounts of space, weight and cost. As I write this, a carrier with only two reactors—instead of eight—is being discussed. Indeed, are the advances in our nuclear propulsion plants. Many authorities believe that tomorrow's reactors may never need refueling.

Navy Pioneers Tomorrow's Power

The great industrial power revolution of yesteryear allowed for adoption of steam turbines by the Navy to propel its battleships and other warships. It is reasonable to assume that benefits of the peaceful uses of atomic energy, far exceeding the cost of the nuclear power plants in naval ships, will result from the continued use and development of nuclear power in the Navy.

With its year protection, the Navy scores at a variance whose vast scope is not yet fully realized. Here are some of its advantages: Virtually unlimited cruising range at high speed, greater maneuverability because of lack of acceleration, deceleration, and cut-down power, much less time to get up steam.

The cost of supplying an operational fuel is saved over the ship's lifetime. Gone is the need for frequent, time-consuming fuel replenishment, and the space saved by not using oil permits more armament to be carried.

The elimination of smoke on the flight deck makes flying safer now pilots can land without having to fly through a blast of hot gases. With all these stack gases, corrosive crash prone planes, countless man-hours and dollars are saved.

No longer must upper decks and superstructure be cluttered with large air-passage spaces. Greater gas-tight integrity assures safeguards the ship from storm damage and both chemical and thermal attack.

"The ship does not depend upon great quantities of air to sustain combustion, as do the fossil fueled ships," Captain McIntosh explained. "The results of radioactive contaminants can be excluded as the ship drives through an air mass contaminated by atomic or chemical agents."

I had seen much of the Navy before my cruises with the Sixth Fleet. I have found it dispersed throughout most of the world. We are contributing its strength to the cause of peace everywhere. Together and during the NCN never sets on the USN. It is ready for whatever may come, wherever it comes.

Aboard *Enterprise* and other Sixth Fleet combat ships, I have cruised thousands of miles. And not long ago I sailed and flew up and down the far reaches of the Pacific with our Seventh Fleet.

In recent years I have shivered at the sight of Russian trawlers, decks bristling with electronic listening and measuring equipment, steaming brazenly among our ships in maneuvers off Portugal. And I have ridden a plane down the Bermuda Sound with the uneasy knowledge that the Chinese Reds were watching us on their radar screens. Such things are routine to our Navy today.

One Shot, One Hit in Missile Age

As a student of the Navy since my own days of knickers days nearly half a century ago, I have learned that the most constant thing about it is—change. The Navy has been in motion all its 188-year history. There was the evolution from sail to steam, and from wooden ships to steel. There was the advent of the seaplane and the airplane. Today missiles and nuclear weapons have come to the fore.

Yet the Navy retains its flexibility, never "too capable" and ready to use either conventional or nuclear weapons as required.

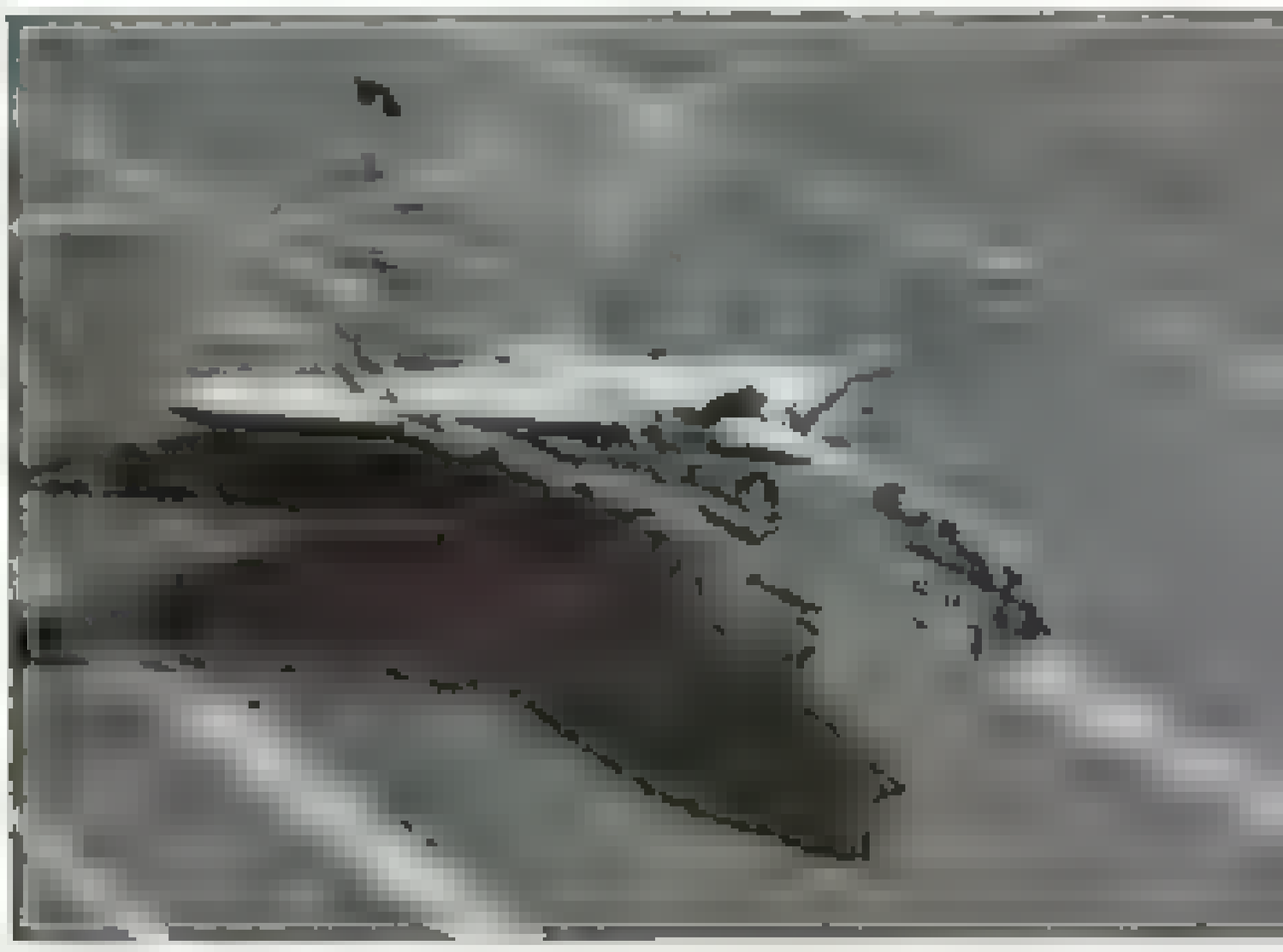
We used "garden-hose" warfare in World War II, spraying targets with relatively inexpensive bullets and shells. Now surface to air missiles, like the Terrier and Talos, are very expensive—and we perhaps must have a different system, one shot, one hit.

The Navy today costs the U. S. taxpayer $14,300,000,000 annually, roughly $126 for

Mock War Rages on the North Carolina Coast as Marines Storm Ashore

Much like the human body, the Navy needs exercise now and then to keep at peak efficiency. This year Navy and Marine units conduct more than a hundred major training operations. These air and ground forces of the Second Marine Division in a practice amphibious operation at Onslow Beach near Camp Lejeune, Marine officers with combat ready troops and gear hit the enemy's lines in an overpowering maneuver.

Bor[illegible] Cross[illegible] No. 2[illegible]



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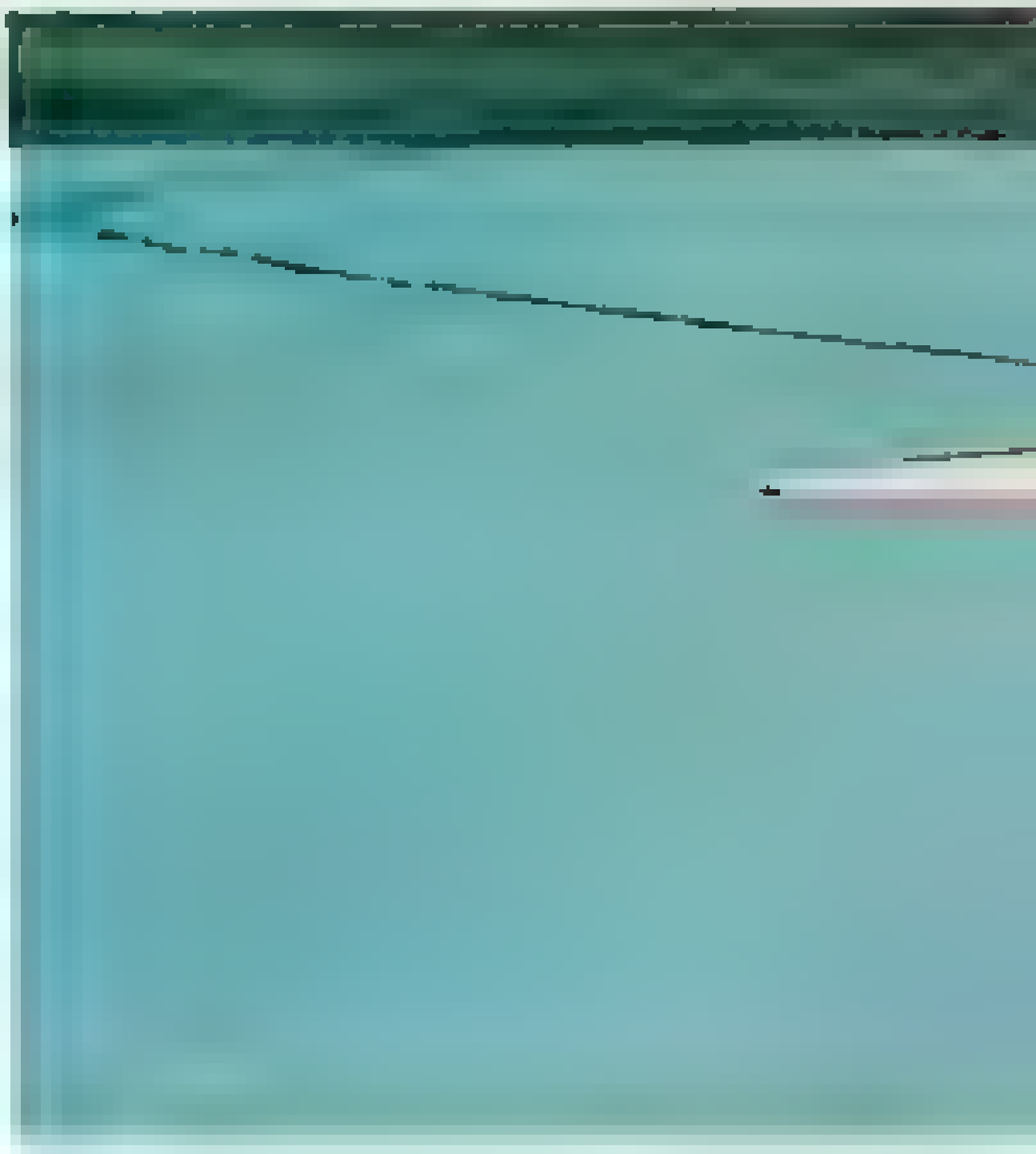
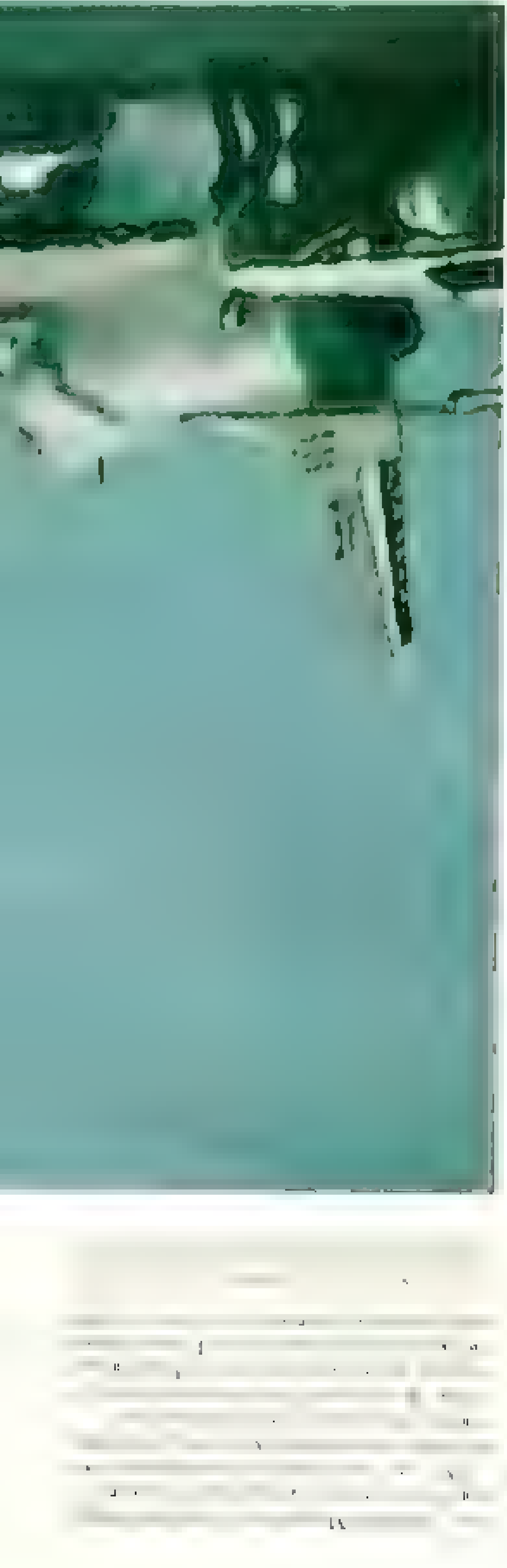
Berlin[illegible]






147853
USS ENTERPRISE

AMERICA'S ★★★★ FOUR-FLEET NAVY

STANDS WORLD-WIDE WATCH

SEVENTH FLEET ranges the east reach es of the western Pacific with a command that spreads west from Hawaii, north to the Arctic, and south to the Antarctic. Units of the fleet patrol the danger-primed waters off Southeast Asia.

FIRST FLEET bulk of U. S. naval power in the Pacific, operates from Hawaii eastward. Its units train and refurbish for rotation with those in the Seventh Fleet. The First and Seventh comprise the major elements of the Pacific Fleet Command headquartered in Hawaii.

Navy ships and planes supply Operation Deep Freeze now in its tenth year of Antarctic scientific research. Icebreakers open sea routes to McMurdo

MAP NUMBERS SHOW BASES AND STATIONS SUPPORTING THE NAVY'S SEAGOING FLEETS

1. Christchurch, New Zealand, is home base for the Navy's Support Force that supports Seventh Fleet bases in Antarctica, including Amundsen-Scott Station at the Pole. Honolulu serves as headquarters for the combat-ready First Marine Division, reinforced, and as a training ground for mountain, desert, and jungle warfare.
2. Kadena Air Base provides home and headquarters for the First Marine Air Wing and Naval Patrol Wing.
4. Yokosuka, Japan, the home port for the Commander of the Seventh Fleet.
5. Hawaii, hub of U. S. Pacific forces, headquarters of the Commander in Chief for the Pacific area (unified command of all U. S. services); of the Commander in Chief, U. S. Pacific Fleet; of the Fleet Marine Force Pacific; and of the Pacific Fleet Submarine Force, Antisubmarine Warfare Force, Service Force, and Barrier Force.
6. Long Beach, California: Pacific Fleet's Mine Force makes its headquarters here.
7. San Diego, California, largest Navy installation on the U. S. west coast. The Commander of the First Fleet makes this his headquarters. Also headquarters for the Pacific Fleet's Cruiser-Destroyer Force, Amphibious Force, and Naval Air Force. First Marine Division bases and trains at nearby Camp Pendleton. Third Marine Aircraft Wing flies from here.
8. Newport, Rhode Island, headquarters for the Cruiser-Destroyer Force, Atlantic Fleet.
9. New London, Connecticut, serves as the Navy's prime submarine base and training area for submarines.
10. Washington, D. C.: U. S. Navy's nerve center.
11. Norfolk, Virginia, world's largest naval base; headquarters for the

Flags at Washington indicate the Secretary of the Navy the Hon. Paul H. Nitze [illegible] anchor, Chief of Naval Operations Admiral David L. McDonald (four stars on a blue and white field), and Commandant, Marine Corps, General Wallace M. Greene, Jr. (red field). Four stars on a blue [illegible] designate full admiral commands

- ✈ Naval air station
- ⚓ Naval base
- ▬ [illegible] support [illegible]
- ✈ Naval area command headquarters
- ⚓ Navy yard
- ⚓ Communication station

SECOND FLEET [illegible] the western Atlantic [illegible] Northampton and the Wright, two communications command ships [illegible] and ready to serve the President as sailing White House in case of an atomic emergency. Ships and men of the Second rotate with those of the Sixth.

SIXTH FLEET guards the underside of Europe and, with no Mediterranean base, takes its supplies from the Atlantic Fleet Mobile Service Force. The Commander's flagship makes Villefranche its normal home port. The Sixth, called the "Friendly Fleet," holds the affection of thousands around the Mediterranean with its good-will acts.

Commander in Chief Atlantic [illegible] serves also as Commander in Chief of the U.S. Atlantic Fleet and the Supreme Allied Commander Atlantic for NATO. The base furnishes home-port facilities for all types of Atlantic Fleet ships and [illegible] flagship of [illegible] the Second Fleet. Here also are headquarters of the Atlantic Fleet Naval Air Force, Submarine Force, Antisubmarine Warfare Force, Service Force, Training Command, and Fleet Marine Force. The Atlantic Amphibious Force Command bases at nearby Little Creek, Virginia. In North Carolina, Marine Corps Second Division stands alert at Camp Lejeune, and the Second Marine Aircraft Wing flies from Cherry Point.

2 Charleston, South Carolina: home base for the Atlantic Fleet's Mine Force, provides a support base for Polaris submarines [illegible]

3 Mayport, Florida: bases Atlantic Fleet aircraft carriers. The [illegible] wings fly from [illegible] Jacksonville.

4 Key West, Florida: headquarters for Caribbean Area Patrol.

5 Guantanamo, Cuba: harassed by Castro, carries on as the most important base for ship shakedowns and crew training.

6 Panama acts as headquarters for the U.S. Naval Forces Southern Command, the Panama Sector of the Caribbean Sea Frontier, and the Western Sea Frontier.

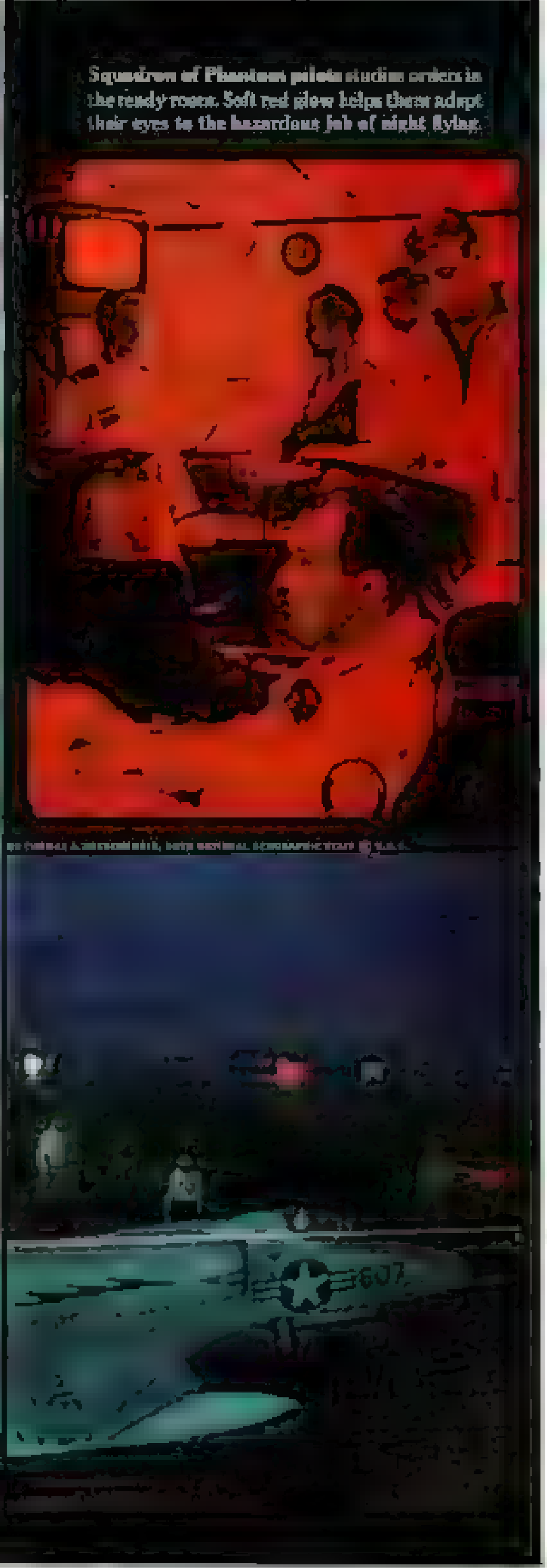
Puerto Rico: headquarters for the Caribbean Sea Frontier. Naval base at Roosevelt Roads. Navy and Marine Corps conduct amphibious training on Vieques Island.

8 Bremerhaven, Germany: provides the European base for the Military Sea Transportation Service.

9 Naples, Italy: houses the southern European headquarters of NATO, presently commanded by a U.S. admiral. Other activities centered here include the command of the Sixth Fleet's air support.

Flight-deck monitors aboard *Enterprise* spot aircraft models on a plotting table and relay instructions for planes taking off and landing.

On deck, a Skyhawk A-4C catapults into the night with bulletlike speed. Another trundles into launch position over a second catapult.



Squadron of Phantom pilots studies orders in the ready room. Soft red glow helps them adapt their eyes to the hazardous job of night flying.

[illegible] photographs [illegible]

[illegible]

[illegible] of one of the [illegible]

[illegible]

[illegible]

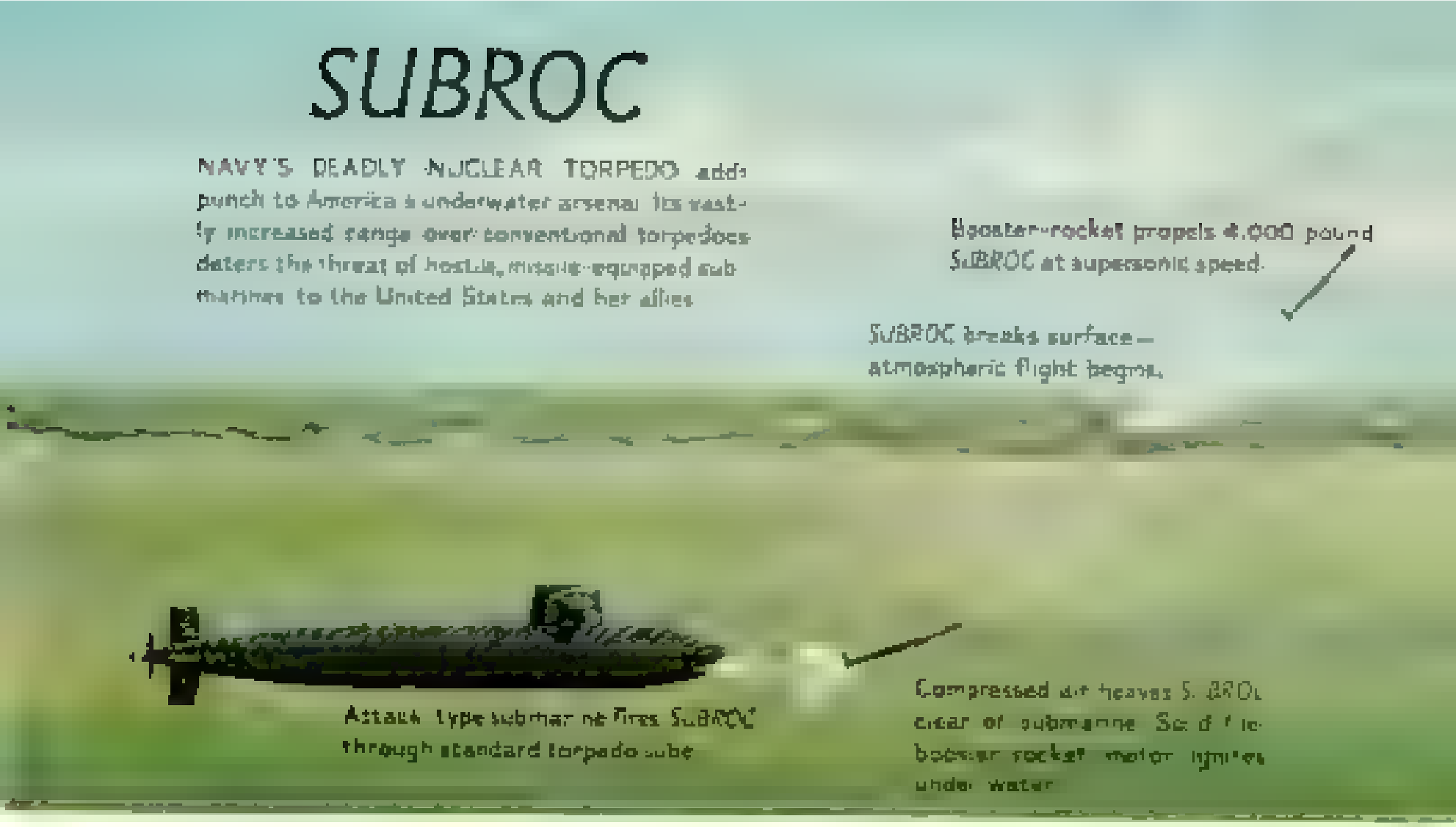
[illegible]

I don't think that any place on earth today is beyond the range of attack from the [illegible] of friend Rear Adm. [illegible]

CAT-AND-MOUSE DRAMA *in the Atlantic. Beneath the waves lurks an Axis submarine, playing the role of enemy. On the surface and in the air, hunter-killer forces glitter the sunlit. Helicopter in foreground, its downwash ruffles the water, dunks a sonar device that pinpoints the target. Grumman S-2F Tracker flies between destroyers* Samuel B. Roberts *(left) and* Charles S. Perry. *A moment later, the second copter drops an exercise homing torpedo. Strike one sub.*

SUBROC

NAVY'S DEADLY NUCLEAR TORPEDO adds punch to America's underwater arsenal. Its vastly increased range over conventional torpedoes deters the threat of hostile, missile-equipped submarines to the United States and her allies.



[illegible] "Almost three-fourths [illegible] surface as water," noted the admiral who is Atlantic Fleet Commander of Cruisers and Destroyers. "Many [illegible] from carriers [illegible] be launched from bases on the surface or [illegible]—these can reach anywhere."

[illegible] our fleets are [illegible] effective [illegible] of battle. Besides the attack carrier strike force, [illegible] logistic support force, mine [illegible] and patrol force. It also includes an antisubmarine carrier group, known as a hunter-killer or HUK, unit. Another important element is the airborne early warning force, sometimes called the barrier force. [illegible] with attack carrier and antisubmarine carrier groups. Besides providing air defense [illegible] from submarines, they carry long-range missiles and heavy guns for shore bombardment.

Each fleet also has [illegible] Marines. In training exercises they often act as the [illegible] to furnish [illegible] transport in fleet amphibious operations.

The Navy lays great emphasis [illegible] amphibious force of attack transports, attack cargo ships, landing ships, beach landing craft, and helicopter assault aircraft carriers. It can put Marines quickly ashore anywhere in the world—and sustain them.

How fast can the Marines move? Gen. Wallace M. Greene, Jr., Commandant of the Marine Corps, [illegible] from its Okinawa [illegible] the Third Marine Division, Reinforced, with its artillery, tanks and small [illegible] support, can be on its way within 12 hours. Teamed with its air support will be the First Marine Aircraft Wing [illegible] in the western Pacific.

[illegible] mobile logistic support force [illegible] ammunition, and other supplies to the combat vessels (pages 178-9).

[illegible] in both Atlantic and Pacific from [illegible] bases, the airborne early warning group sends out its long-range planes with their powerful radars, to fill gaps in surveillance (page 18).

The mine force [illegible] shallow offshore waters [illegible] areas, while the [illegible]

Flying Lady" Hunts Down Subs

[illegible] to get a taste of antisubmarine warfare I flew in the aircraft carrier *Yorktown* then serving with ASW Carrier Division 19. The division was taking part in a Southeast Asia Treaty Organization (SEATO) exercise code-named Sea Serpent, in the South China Sea.

We took off on *Yorktown* in a Grumman C-1A, the Navy's rugged, twin-engine personnel and mail carrier (nicknamed "carrier on-board delivery" plane, or COD). I have set down in CODs on carriers many times (yes, and even


Rocket motor's reverse thrust system separates booster from warhead
Depth bomb allows a ballistic course toward target
SUBROC plunges into ocean and penetrates to a calculated depth. Its nuclear warhead detonates and destroys the enemy submarine
Spent motor falls into sea
Long range sonar locates and tracks enemy submarine. Fire control system arms the warhead and sets SUBROC's flight path

[illegible] under water than [illegible]

[illegible] lath and goes up [illegible] "messages" [illegible] side by side like an aircraft's pilot and copilot.

[illegible] in the control space with [illegible] and William W. Hebness, Jr. [illegible] marvelled at [illegible] made over [illegible] We talked [illegible] terms [illegible] that at times I felt to have on [illegible]

[illegible] opened. The [illegible] agent off [illegible] was a crisp sound [illegible] force [illegible] deep beneath [illegible]

[illegible] over the hatch [illegible] the double. The [illegible]

[illegible] to the. The [illegible] [illegible] to Commander Beamer [illegible] are dirt. [illegible]

[illegible] dangerous emergencies. We [illegible] Engineer officers and men [illegible] the blade. [illegible] where I had started [illegible]

[illegible] I was to be [illegible] the new restricted [illegible] to wear the [illegible] of the submarine.

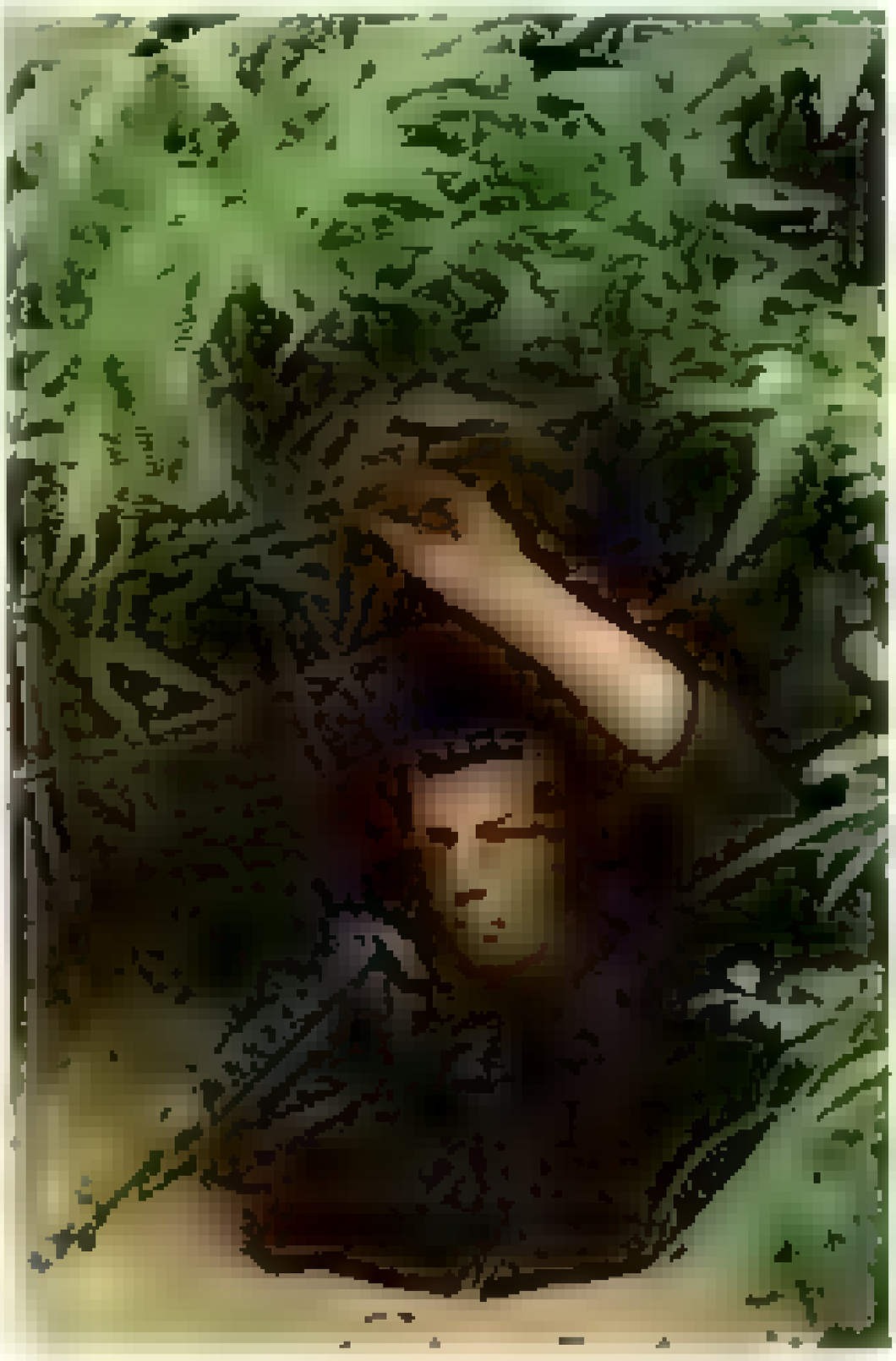
Polaris Handbook of Submarines

[illegible] the *Skipjack* boat [illegible] her modest endurance, tender air [illegible] because of their nuclear propulsion. [illegible]

[illegible] Joseph H. [illegible] the two black missiles [illegible] that. You squeeze through narrow hatches [illegible] we took up your way downstairs to the [illegible]

[illegible] than a medium-size refrigerator. Two com-[illegible]

[illegible] B. Wilson, the skipper, and his officer [illegible] A. [illegible] Polaris submarines authorized [illegible] Congress, we were told, were already but [illegible]



I saw Bernard [illegible] Mazzuc, "an enum[illegible] [illegible] the [illegible] wiped [illegible] the [illegible] pulse.

Make-believe guerrillas

[illegible] Marine [illegible] the men for [illegible] The Corps's [illegible] shame in history. Marine Corps [illegible]

Jungle's lush beauty is wasted on [illegible]

[illegible] Commander Wilson [illegible] 5 feet long and [illegible] 8,000 tons when submerged and 7,000 tons on the surface. Her A-3 missiles take the place of shorter-range A-2's and A-1's—[illegible] strike with a nearly accurate [illegible]

Commander Wilson spoke from experience. His ship launched the first A-3 [illegible] of them, which [illegible] Missile Range (about [illegible] miles).

Unreal as a self-contained mortal [illegible] stern these missiles [illegible] they are on their way. [illegible] Impel in World War II.

Fifty-four Days Under Water

I found *Andrew Jackson* [illegible] through the [illegible] and [illegible] the [illegible] numbers—two rows of eight tubes known as Polaris stand as "Sherwood Forest."

A Polaris missile stands 31 feet high with a diameter of 5½ feet. The tubes are kept at constant air pressure and temperature.

The guidance systems are missile's heart. Commander Wilson [illegible] "In the [illegible] we find a guidance system [illegible] we can replace it in less than an hour."

As to range, a Polaris submarine in the Atlantic [illegible] can hit New York and Europe with A-3 missiles [illegible] the Pacific 15[illegible] miles west of San Francisco.

And what, I asked the skipper, of the 15[illegible] men who [illegible] with these [illegible] each Polaris [illegible] the Pole and the Coast [illegible] 1960 [illegible] when the first Polaris [illegible] never once surfacing. Now with many Polaris ships coming on station [illegible] 54 days. A leave and rest [illegible] where the [illegible] crew is at [illegible]

[illegible] to stay on a Polaris is [illegible] people [illegible] The ship which [illegible] receive radio messages while submerged [illegible] give away its location.

[illegible] about news [illegible] person [illegible]—some know [illegible]

Navigation [illegible] men miss their family [illegible] the station. "But their response and [illegible] are perfect. We have [illegible] missile [illegible] What [illegible] keep [illegible] of returning home—is anticipating their [illegible]

They should. It is the best in the Navy.

Now *Andrew Jackson* reached [illegible] in an area of the Atlantic proscribed to all [illegible]. Down we [illegible] Commander Wilson [illegible] battle station. He had received a "war message", he and his executive officer had verified it.

The countdown began. If all went well [illegible] used to fire a missile but [illegible] rocket on [illegible] would be [illegible]

[illegible] some [illegible] authentic. A [illegible] for the countdown and first [illegible] launching [illegible] for each succes[illegible]

On S[illegible] south coast, I saw a [illegible] Marines' first [illegible] demonstration [illegible] beach of obstacles. Then [illegible]

[illegible] field headquarters, ammunition depots, a fully equipped field hospital, an airbase for helicopters, and [illegible] touch with the fleet at sea.

Amphibious operations like those of World War II [illegible] Marines, but they must [illegible] this sort of airborne assault uses [illegible]

The LPH brings [illegible] Marine [illegible]

Marines in [illegible] South Viet Nam are using training they received at the General and Jungle Warfare Schools in Okinawa.

[illegible] photographer John E. Fletcher and I [illegible]

[illegible] anything [illegible]

[illegible] Jungle Warfare School we [illegible] Maj. Charles [illegible] its commander [illegible]

[illegible] We're [illegible]

Marines Train for Distant [illegible]

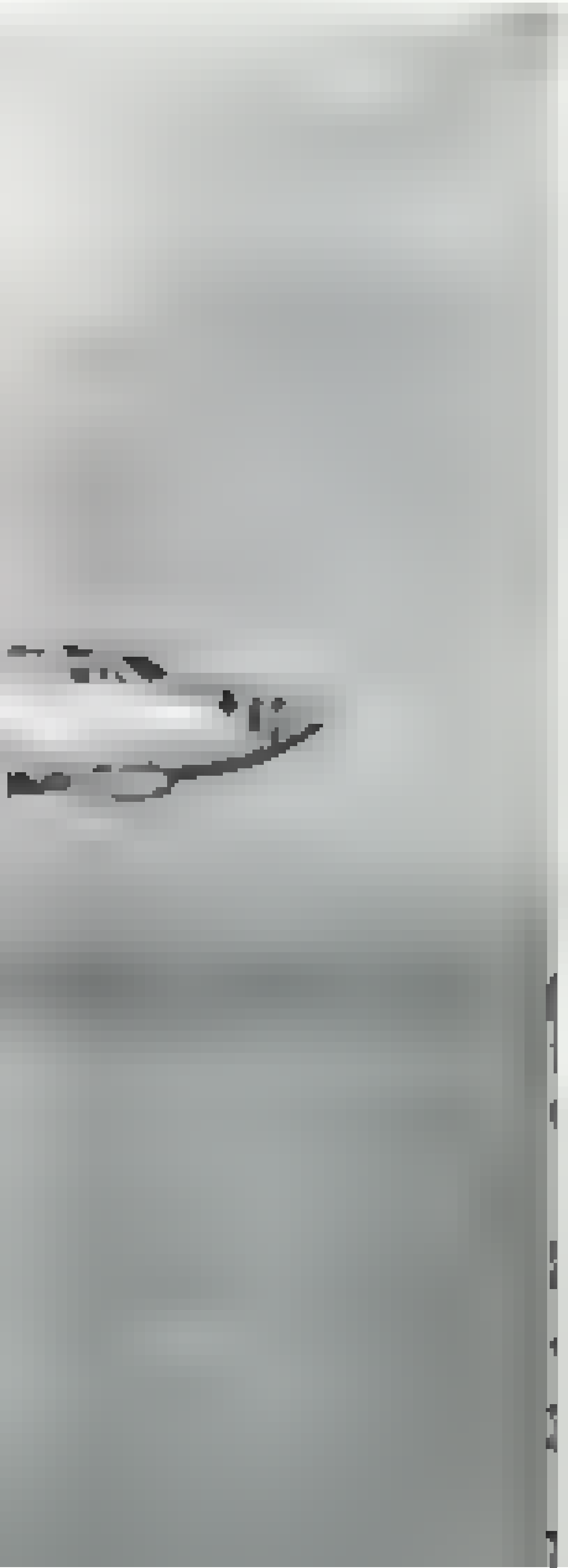
[illegible] stream, waist-deep [illegible]

Someone ahead of me [illegible]

were down [illegible]

[illegible] He [illegible] keep [illegible] their toes," the instructor explained.

On we sloshed through green and fetid [illegible] plants growing heavily along the stream [illegible]



[illegible]

[illegible] it to be a Marine dressed in Oriental clothes [illegible] I continued, theoretically, unquestioned.

[illegible] the Marine next to the patrol leader's [illegible] the jungle [illegible]. The sergeant grabbed him and pointed wordlessly to a camouflaged [illegible] he had just missed. On a real patrol, it might well have been lined with razor-sharp bamboo.

On we went, moving stealthily like [illegible] into the jungle, its members alert to sounds such as the snapping of a twig. All the while I kept [illegible] out for the [illegible] poisonous [illegible] there on the ground, in the water, or in foliage overhead.

Finally we found ourselves blocked by an almost vertical cliff [illegible] high. Using ropes, the Marines scaled it.

But I was a twenty-six-year-old citizen, not a Marine. Major Cooper [illegible] mercifully showed me a longer path around the cl[illegible]

Fleets Replenish Stores Under Way

Marines and mariners, the men of the [illegible] rovers whose ships know every ocean [illegible] particular branch of service is [illegible] the Navy I saw proved much the same [illegible]

[illegible] however, sets the two overseas fleets apart. The Sixth has no shore bases. It patrols the underside of Europe constantly as a [illegible] organization, mobile and self-sustaining, in the [illegible] the Mediterranean.

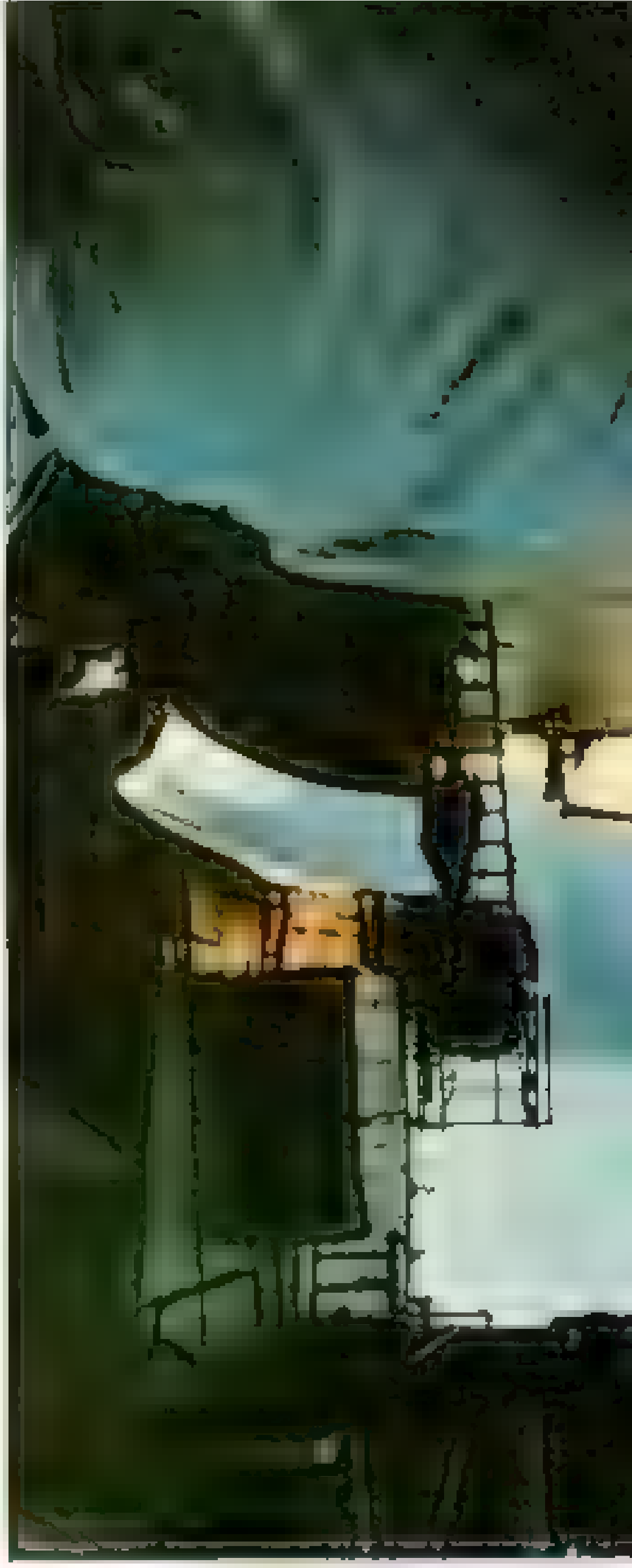
Thanks to its service force of fleet tankers and [illegible] vessels, the Sixth can stay at sea [illegible] Its support comes [illegible] the Atlantic [illegible] and ships rotate every four to six months.

The Seventh, on the other hand, has many shore bases, [illegible] dry docks. Its ships can go for years without returning to the United States. Some 55,000 [illegible] work on our vessels at the great naval bases of Yokosuka and Sasebo. Seaplanes and the Seventh's [illegible] squadrons [illegible] are overhauled at Japanese aircraft plants. Repairs are made in less time and at considerably less cost than [illegible] sent back to the United [illegible] Commander Naval Air Force, Pacific [illegible]

[illegible] have one outstanding characteristic: long-sustained [illegible] power. They can be completely independent of over[illegible] for [illegible]. Underway replenishment, a Navy system

Departing Midway at dawn, a [illegible] Lockheed [illegible]

[illegible]



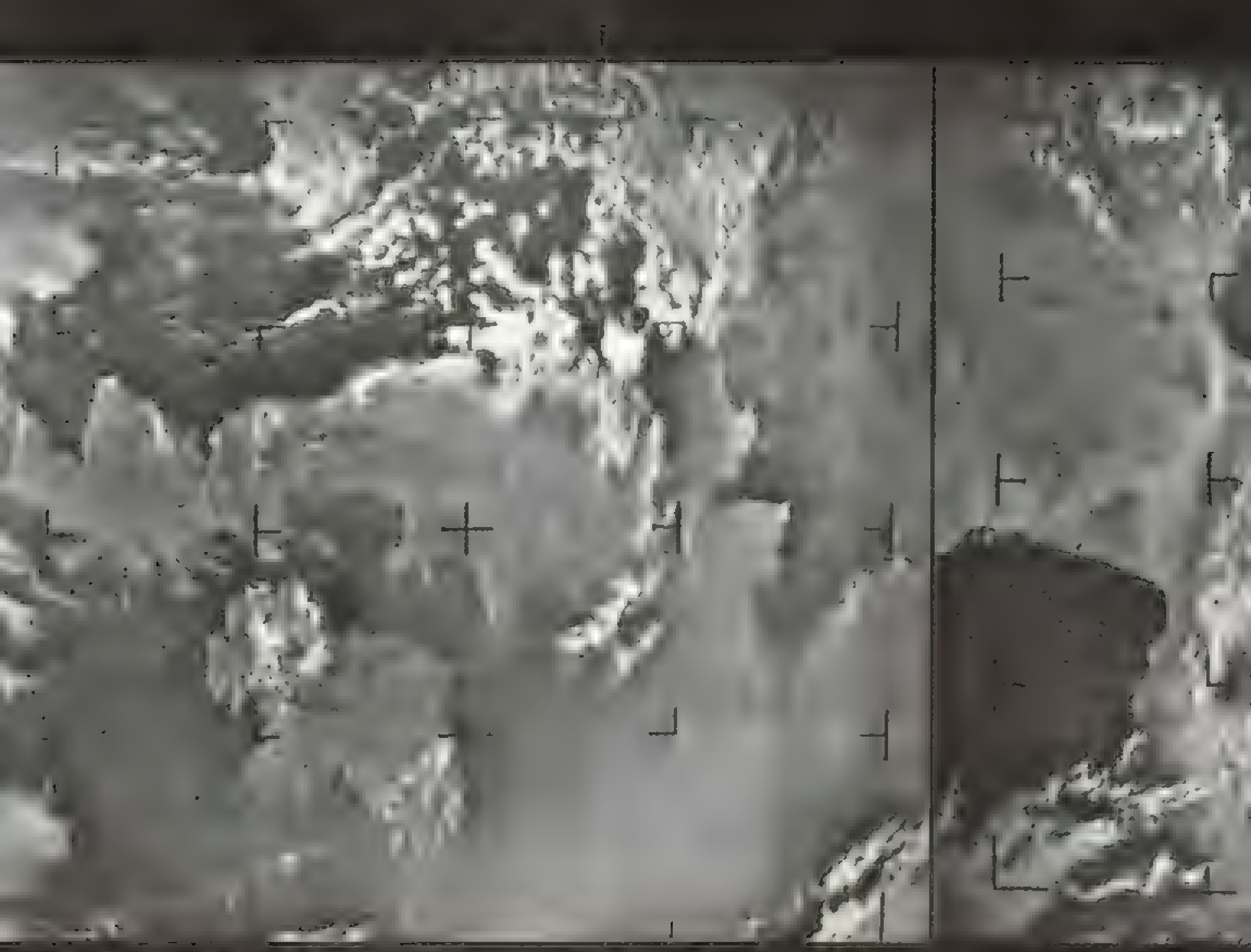
[illegible] Takes Over [illegible]

[illegible]

Changing World Sits for a New Portrait

Extraordinary Photograph Shows Earth Pole to Pole

B



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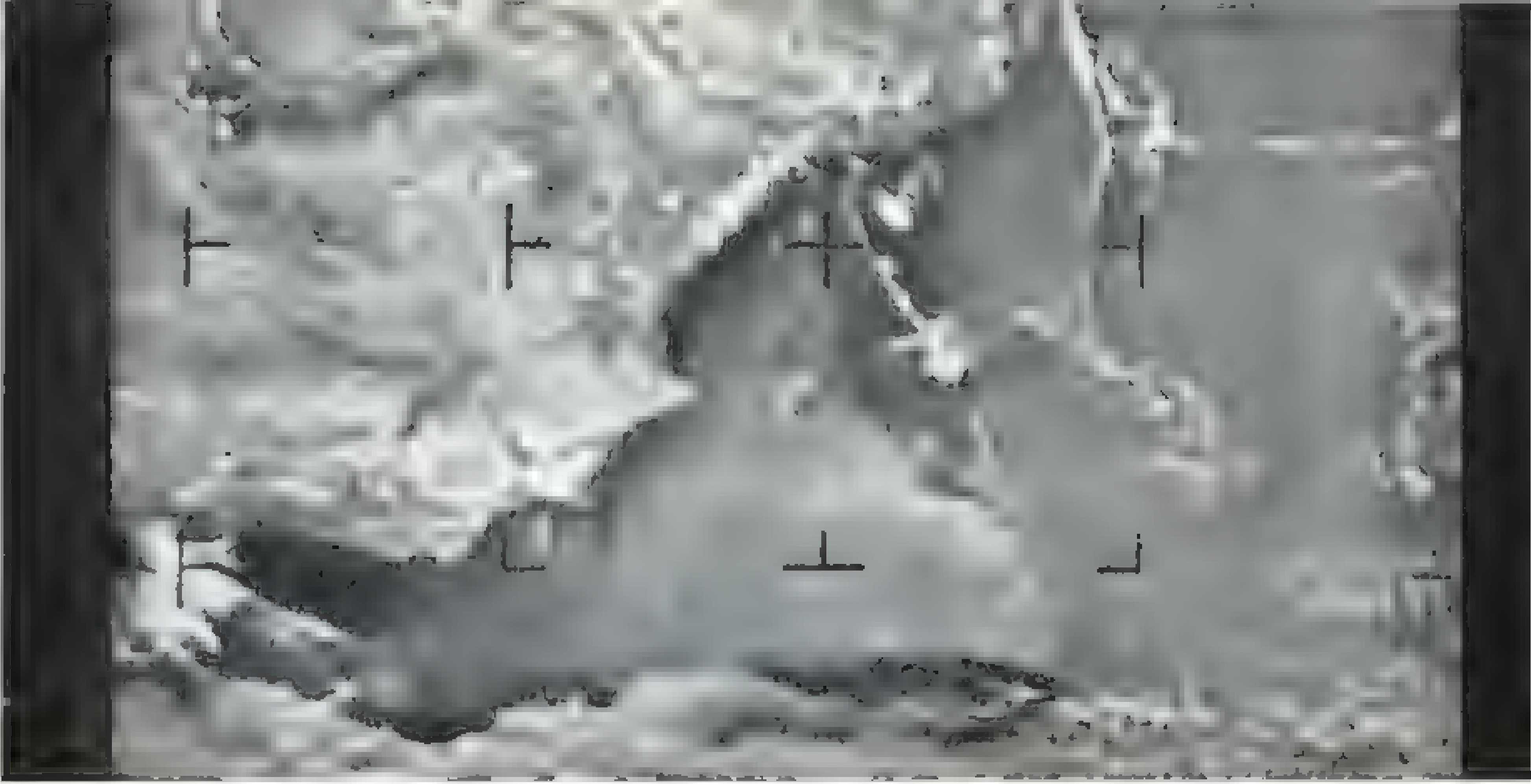


Western Europe
Nordics | Alpine Rural Areas
France and Spain
Europe 500 Miles Wide

The Leakeys of Africa

FAMILY IN SEARCH OF

By MELVIN M. PAYNE, Sc.D.
President and Scientist of National Geographic Society

PREHISTORIC MAN

fossils unearthed by the Leakeys—*Proconsul*, *Kenyapithecus*, *Zinjanthropus*, *Homo habilis*—we know much more about the dawn [illegible]

[illegible] few years ago.

So rapid and so aggressive are these conclusions to knowledge that they have variously [illegible] per [illegible] year in Dr. [illegible] [illegible]

[illegible] that many scientists now believe to be a [illegible] pressure of numbers [illegible] Leakeys have [illegible] that it may be every excavating [illegible] [illegible] only a few generations."

Since questioners Louis concerning the vast area of disagreement among scientists engaged in prehistoric research, [illegible]

discarded concept [illegible] of human fossil [illegible] and the necessity for [illegible] bank [illegible] extend my through hundred [illegible] [illegible] genus of interpretations. But this is all we have to work with, we must make the best of it within the limited [illegible] knowledge and experience.

Scientist Grew Up in Kikuyu

[illegible] makes unprecedentedly accurate the [illegible] [illegible] makes [illegible] that, though that design [illegible] for everything [illegible] these toward their predecessors [illegible] distant past. Had Mary Leakey [illegible] introduced to paleolithic caves [illegible] Lascaux of France when she was [illegible]

[illegible] Nelle [illegible] some 7 to 8 trackless miles [illegible] Africa [illegible] Mary Hazzard [illegible] Nelle told [illegible] of [illegible]

[illegible] "[illegible]

[illegible] Mary Hazzard [illegible] assistant [illegible] "[illegible] Mrs. Hazzard has hired porters and [illegible] for the interior. We must overtake her.

Nelle smiled the commissioner's [illegible] wife of Africa. "We can't leave her a single day or two she'll be back. And [illegible] modern [illegible] perfectly well [illegible] never saw. Nelle [illegible] Six [illegible] in [illegible]

Alarm Clock Frightens Away Lions

"[illegible] Nelle," remarked [illegible] maintained that her only weapons [illegible] were an umbrella and an alarm clock. She'd set the clock at two-hour intervals throughout the night. She reckoned that [illegible] would be [illegible] the sound of the alarm would [illegible] most, for Leakey family [illegible]

Louis's parents, Harry and Mary, took over a [illegible] miles from a [illegible] Nairobi. There they [illegible] the Kikuyu, Kenya's largest tribe. And there on August 7, 1933, was born their first son, Louis, now our Boxer Leakey.

Word of his birth spread quickly, and the Kikuyu travelers came. They sat down solemnly about the cradle and spat on the [illegible] as a gesture of trust.

[illegible] explained, "[illegible]

Is a dinosaur [illegible]

[illegible]

Stone-Age Stockhouse Shows Wares Manufactured 200,000 Years Ago

[illegible]

[illegible] that through a [illegible] fascinating stories [illegible]

Tales of [illegible] them with his hand

By the time he was 13 years old, he had [illegible] knew "for riders" and [illegible] whenever his parents allowed.

Secret Oath Protects Tribal Rite

[illegible]

But even Mary doesn't know the [illegible] as a [illegible] into manhood. "They [illegible] swear an oath of secrecy," she said. "And even [illegible] the years [illegible] the Maasai Mara [illegible] in Kenya, where it wasn't very popular [illegible]

[illegible] word and never described the ceremony. As far as I know, he's still the only white person [illegible]

"Of course," she smiled. "He's no longer a warrior. He's become an elder now."

[illegible] warhead, still remembers [illegible] green, and [illegible] at the bush with an [illegible] of the Lorodia tribe, Joshua Ml'ahua, who taught him how to stalk game. In the [illegible] he one of perhaps [illegible] elected at [illegible] ance, I've [illegible]

[illegible] camouflages himself with [illegible] and [illegible] the outline of his back. Then, from a [illegible], he commences his cautious approach. He advances from an oblique angle; a direct stalk would send the buck darting into the underbrush. Slowly [illegible] inch by inch the man draws near.

Joshua freezes as the animal alert [illegible] its head and stares at him. What do these eyes represent? A beast? A small tree? Reassured, the [illegible] lowers its head once more. Joshua waits. Then he moves forward a few step[illegible] another. His hands are held against his sides, a ways he [illegible] them, [illegible] to wild creatures he [illegible] spell [illegible]. No bush, no tree possesses those twin instruments of death, and the sight of them provokes terror or rage among Africa's wildlife.

Silently, gradually, the tree that is Joshua wears the deer. Thirty feet. Twenty-five. Twenty. Then, a lightning movement.

Too late the deer sees the tree that is Joshua aroused. A spear flashes. And the hunter will eat meat this night.

Kikuyu Lessons Help a Scientist

Louis remembers, too, the [illegible] he ever [illegible] in front of the Kikuyu huts. As fires burned low, the old man would [illegible] upon the old tales to [illegible] and the boys of his age group. Amusing [illegible], yes, but not idle. For each tale [illegible] its lesson, each [illegible] its moral.

What I asked Louis [illegible] Kikuyu [illegible] contributed to his success as a scientist [illegible] two things." He responded promptly: "Patience—especially patience—and observation. In Africa, survival depends upon your reaction to irregularities in your surroundings. A torn leaf, a paw print, a [illegible] that rustles when there is no breeze, a sudden [illegible]. These are the signals that spell the difference between life and death.

The same instant [illegible] interest—a glint of white in the face of a cliff, an odd-shaped pebble, a tiny fragment of bone—leads to the discovery of fossils.

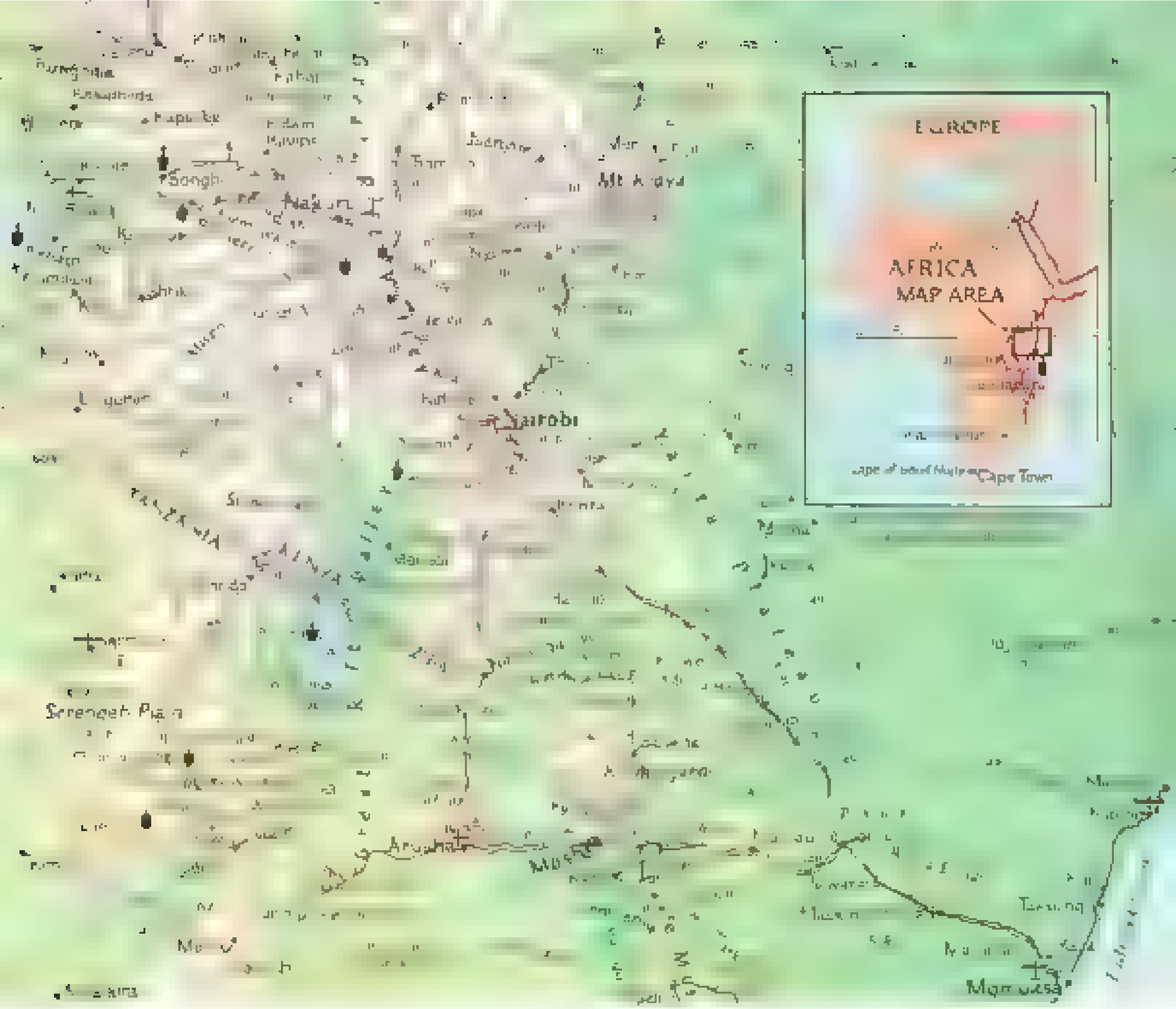
"And patience. I can still hear the Kikuyu elders exhaling the boys of my age over and over: Be patient, be careful, don't hurry. Try again and again and again.

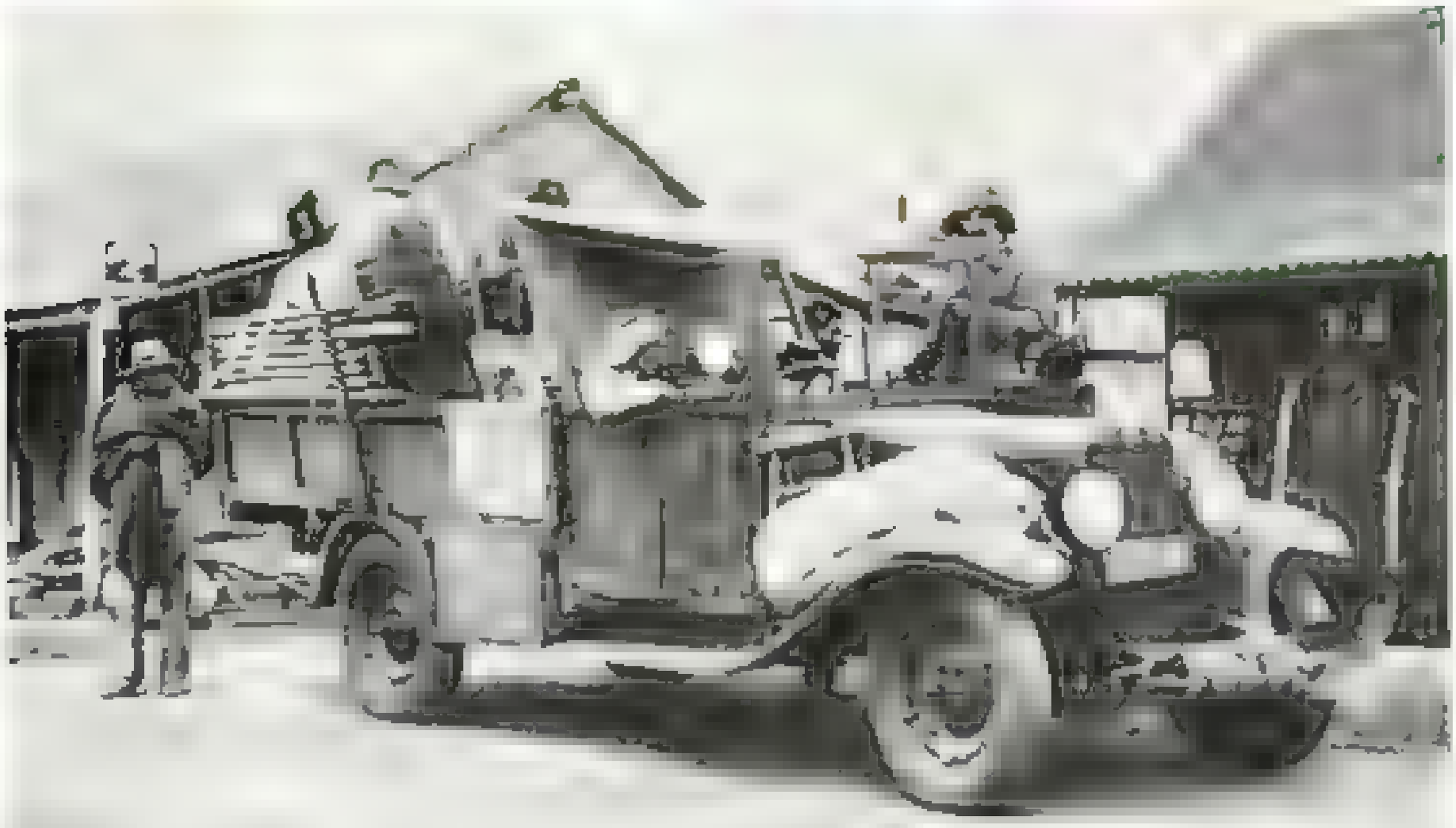
"I remember when Mary discovered the Zinjanthropus skull at Olduvai on the island of Rusinga in Lake Victoria in 1948. We had combed that particular site at least seven times—both of us—without results. But we kept going back, and on the eighth try, Mary found it.

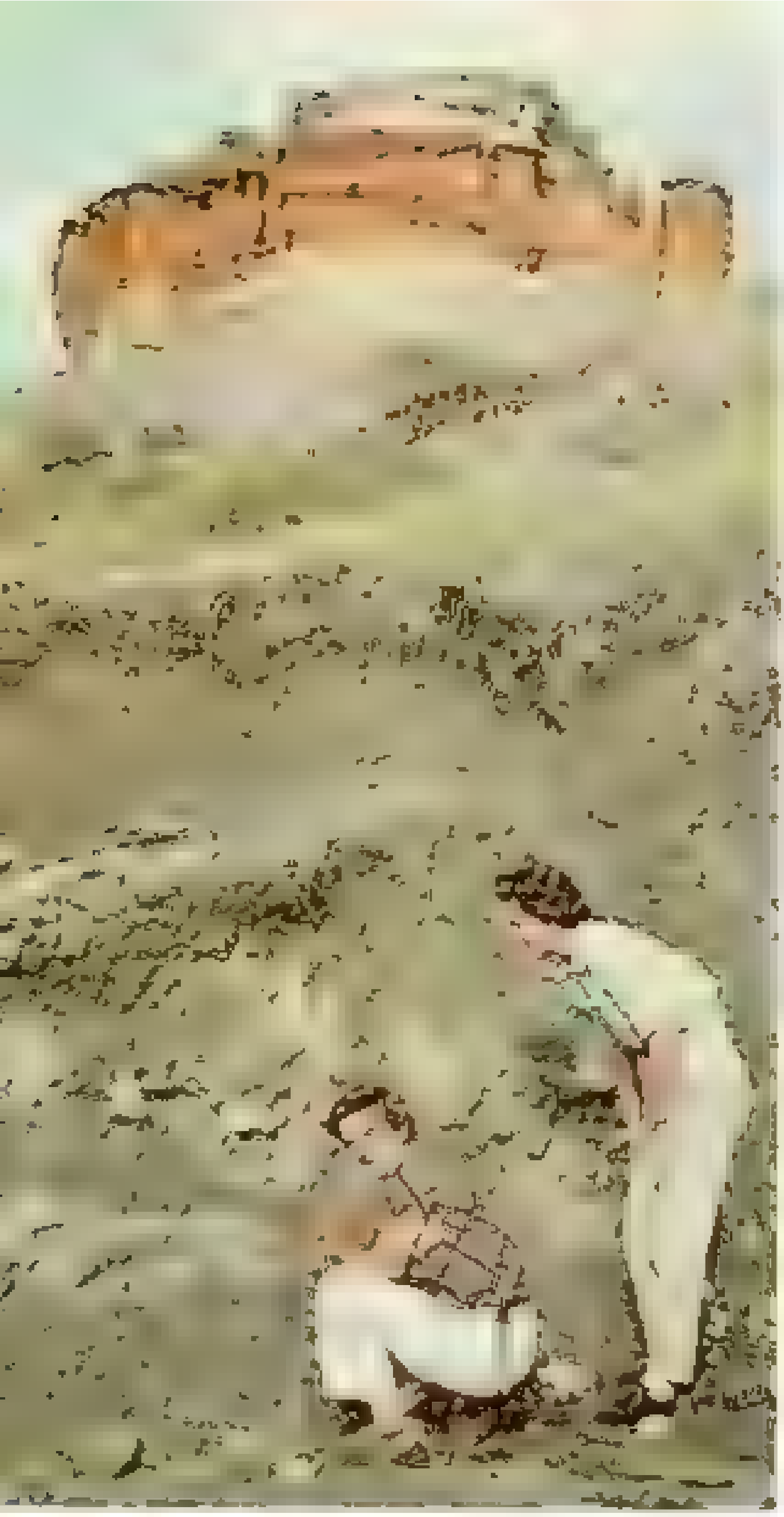
Some scientists would make fun of force

On the track of earliest man, Louis Leakey, [illegible] expeditions have ranged both Kenya and Tanganyika. Fossil of prehistoric man and animals have turned up on rocky [illegible] and on barren [illegible]. Olduvai Gorge, lower center, yielded *Homo habilis* and the skull of *Zinjanthropus*. A [illegible] was found at Fwala, near Lake Natron. *Australopithecus*, reported by Dr. Leakey as a 14-year-old [illegible] boy, was found at Fort Ternan, [illegible]. The Leakeys found a [illegible] *Proconsul* on Lake Victoria islands, and Stone Age man at nearby Kariandusi.

Pathfinder on wheels, this truck carried Dr. Leakey's first expedition to Olduvai in 1931. Roadless plains and frequent stops to cool the engine slowed the party to five miles an hour. Drivers through Africa today rest against the wheel at a small trading post in Kenya. Dr. Leakey stands at far running board. In the dry season, Olduvai's explorers hunt for water; wildlife water even today. The nearest reliable source is about 30 miles away from the excavations.


EUROPE
AFRICA
MAP AREA
Cape Town
Nairobi
Serengeti Plain
Mombasa





[illegible] effective [illegible] preserves [illegible] the [illegible] World War II [illegible] since 1946 saw the [illegible] Lucas [illegible] shelter [illegible] the Lucas [illegible]

[illegible] Mead

[illegible] NATIONAL GEOGRAPHIC staff [illegible] Natural National Park [illegible] for the [illegible]

[illegible] thought that [illegible]

[illegible] towards [illegible] of [illegible]

"There they are," Lucas picked up her [illegible] like to the [illegible] quickly that's [illegible] slowly now. They're looking up [illegible] right and [illegible] that clump [illegible] there [illegible] Varels more am

Just at that moment another car came [illegible] sight and the driver blew his horn. The [illegible]

Beneath the battlements of the [illegible]

[illegible]

[illegible]

Small modest grass hard houses

Many Leaders of Mbere are crew cuts

Theory that the mystery of man's past would be unknown here in Africa. No, it is before

Student Chosen to Examine Human

Recently preserved human bones to the great results that have

[illegible] Europe to other continents [illegible] movements or [illegible] in [illegible] were [illegible] principal routes through [illegible] [illegible] the [illegible] of Paris on a [illegible]

[illegible] combination of [illegible] dysentery, and malaria killed him in Tanganyika. But he [illegible] agent for [illegible] know where."

[illegible] Leakey [illegible] be requirements for [illegible] [illegible] and anthropology [illegible] behavior [illegible] expeditions [illegible] search for early man [illegible] early culture. He told me the story.

"Where do you [illegible] a Cambridge professor asked.

"In East Africa," Leakey answered.

"[illegible] time," the professor [illegible] "There's [illegible] of significance to [illegible] [illegible] want to spend your [illegible] early [illegible]

But Leakey recalled, "I was [illegible] said, 'No. I was born in East Africa, and I've already found traces of early man there. Furthermore, I'm convinced that Africa, not Asia, is the cradle of mankind.'

[illegible] In [illegible] with expeditions and enlisted the aid of a [illegible] student [illegible] money for [illegible] early [illegible] East Africa.

Young Scientist Makes First Finds

"[illegible] and I [illegible] to be [illegible] We [illegible] near Lake Nakuru in Kenya and—on other strokes of Leakey's luck—uncovered a [illegible] site. Nothing [illegible] extraordinary, but a good beginning.

The [illegible] spent [illegible] the [illegible] in East Africa in search [illegible] Fossils [illegible] Leakey and his assistants [illegible] their [illegible] even [illegible] farmers.

Discovery of

D

Workers at the [illegible] site [illegible] of [illegible] fragments but [illegible] [illegible]

Homo habilis. Prehistoric jaws tell a tale

The twenty years that followed witnessed a revival in the exploration of Olduvai [illegible]. In 1945 Louis became curator of Nairobi's Coryndon Museum, and the post allowed him little time for field work. Always short of [illegible] was short of time. Louis [illegible] was [illegible] by Mary [illegible] continued to spend a few weeks a year at the gorge. They covered it foot by painstaking foot, [illegible] exciting [illegible].

Not until 1952 did they begin to dig in earnest. And not until the sensational discovery of *Zinjanthropus* in 1959 did Olduvai fall [illegible]

[illegible] years of excavation.

Now here we are, [illegible] Louis. "At last thanks to the National Geographic Society we at last have enough money to finance a reasonable [illegible] of excavation."

He glanced at his watch. The [illegible] was [illegible] in the darkness. "Nine o'clock [illegible] lions [illegible] hyena [illegible] and [illegible] animals snarling or [illegible] around your tent all night. He [illegible] ever

[illegible]

Masai Spearmen Drive Cattle
Across a Road Near Oldoani Gorge

of a lion should pay us a visit and make a lot of noise—just stay in your blankets and be quiet. He's really not looking for you, and won't bother you if you don't bother him."

I wondered.

Next morning, in the predawn chill, Ethel and I were awakened with a cup of steaming tea. After a brisk wash in icy water, we gathered for breakfast; then, wasting no time, we rode a Land-Rover down a steep, rutted track to the floor of the gorge. The track had been constructed by then 12-year-old Philip Leakey—"the finest Land-Rover driver in East Africa," according to his father.

Philip's jobs include driving work teams to and from the sites in the gorge, making the [illegible] round trip for drinking water with a two-ton tank trailer, collecting truckloads of firewood, and occasionally blazing new trails to new fossil excavations. Virtually since birth, Philip has accompanied his parents on their [illegible] safaris. He has, in addition to this apprenticeship in prehistory, [illegible] become a specialist in African [illegible].

"He's collected some [illegible]," Louis told me, "and he knows their scientific names as well as the [illegible]."*

Skilled Africans Aid Scientists

When our Land-Rover halted on the floor of the gorge, most of the Leakeys' assistants were already hard at work. European and African, they numbered more than two score. Louis and Mary are particularly proud of their African foremen. Highly trained in the art of fossil hunting, they share with Louis the virtues of unflagging alertness and inexhaustible patience. One of them, Heslon Mukiri—a member of the team for 38 years—discovered a fragment of jawbone near Fort Ternan in Kenya that proved to be the first relic of [illegible].

What is it like to hunt for fossils? After a day in Olduvai Gorge, I can wholeheartedly echo Louis's description in the September 1960 GEOGRAPHIC: "It consists," he wrote, "of crawling up and down the slopes of the gorge, eyes bare inches from the ground [page 212], stopping at the slightest fragment of a fossil bone or stone implement."

But to the inexperienced eye, as I soon learned, fossil bones, stone tools, and plain rocks can sometimes look distressingly alike.

The blazing sun at noon drove us back to the shelter of the camp. Before the afternoon return to the gorge, Ethel and I often joined Mary's clinic. Every day since the Leakeys settled here, Masai warriors, elders, and their families who live near the camp [illegible] with wounds, fevers, and a variety of other ills [illegible].

We marveled at the way Mary—so shy in most matters, so soft of voice—scolded, advised, and dosed the towering plainsmen with their fearful spears.

"They simply won't take care of themselves," Mary commented as she [illegible] dispensed drugs and swabbed the infected eyes of [illegible] among the tribesmen.

"These ills are trifling." She gestured at the morose patients. "We can take care of this sort of thing. But occasionally the warriors come in horribly mauled by lions. They hunt them with spears."†

Rock Paintings Shape a Career

The fascinating story of the Leakeys [illegible] to light bit by bit during our stay in their camp. What, I wondered, had brought Mary Leakey—[illegible] as much a part of Africa as her husband—to this distant and desolate gorge? What twists of fate had conspired to [illegible] them for a tireless assault on the murky [illegible] of the past?

Unlike Louis—[illegible]—Mary is [illegible] to the point of reticence. Yet, quite aside from her partnership with her husband, she is an outstanding prehistorian and one of the world's foremost draftsmen in the art of representing stone tools.

Her artistic talent, I learned, was inherited from her father. A successful landscape painter named Erskine Nicol, he had traveled throughout southwestern France. He loved to work in that land of green fields and vivid skies, and the young [illegible] often journeyed with him.

"The area is full of prehistoric caves," Mary said. "Both my parents were interested in them, and I scrambled around the caves while Father painted. At one place, called Cabrerets, a priest, the Abbé Lemozi, had discovered [illegible] rock paintings, and he encouraged me to work with him on them. The abbé kindled my interest in prehistory and gave me a very sound groundwork in excavating. After that, I don't think I ever really wanted to do anything else."

Like art, prehistory was also in the family

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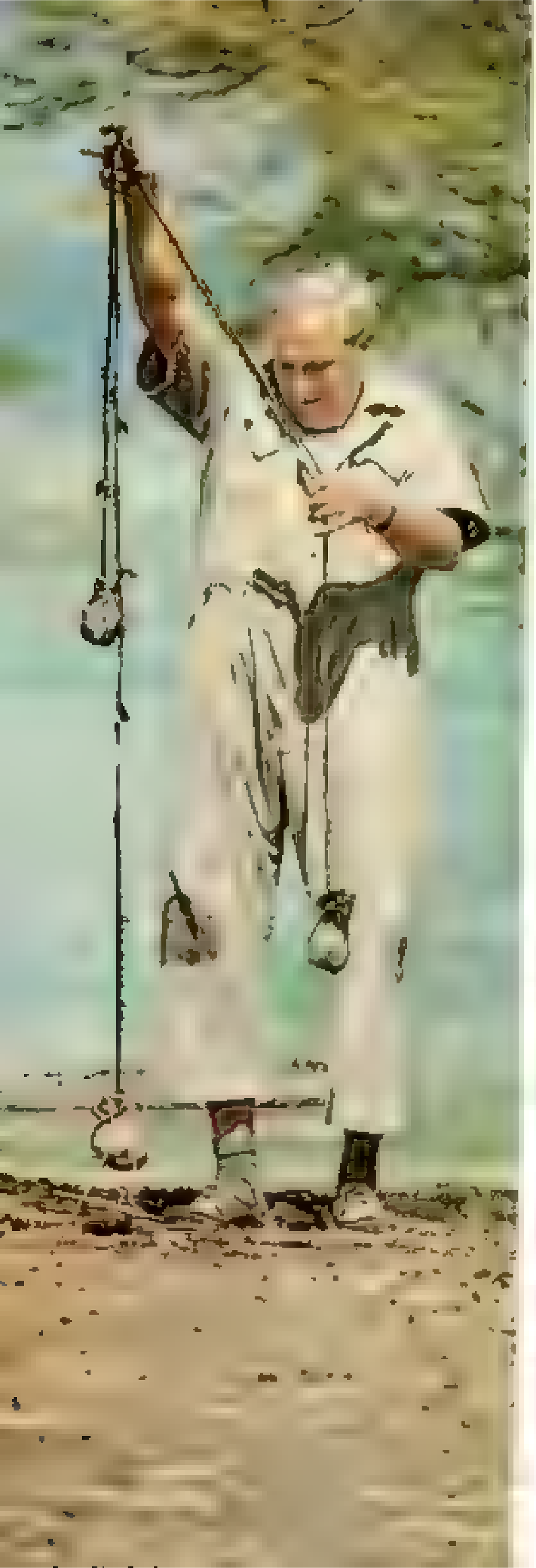
*See "Adventures in the Search for Man," by Louis S. B. Leakey, NATIONAL GEOGRAPHIC, January 1963.

†[illegible] were described in "Spearing Lions with Africa's Masai," by Edgar Monsanto Queeny, NATIONAL GEOGRAPHIC, October 19[illegible].



[illegible] Mary's great [illegible]
John Frere of Hesse in [illegible]
[illegible] Stone Age [illegible]
[illegible]
had taken it for granted that nature had
[illegible] these [illegible]
[illegible]
[illegible] she [illegible] worked in the field
[illegible] [illegible]des in the F[illegible]
[illegible] understan[illegible]
[illegible]

Lecture Leads to a Life in Africa

[illegible]

[illegible] fact [illegible] interea
[illegible] forever and the fact
[illegible]
man from East Africa name[illegible] Louis Leak[illegible]
who s[illegible] on his w[illegible] at Olduvai
[illegible]
Our association began at that m[illegible]
Mary [illegible] J. W. [illegible]
[illegible] with Louis a[illegible]
[illegible]
[illegible] Mary were married
[illegible]
asked her if she ever regret[illegible]
Mrs. Leakey laughed. "Hardly. My [illegible]
[illegible] as had [illegible] [illegible] of his [illegible]
[illegible] encounter with Am[illegible]
were exploring a region of T[illegible]
[illegible] Mary [illegible]
[illegible] Neither of us had seen th[illegible]
[illegible] at. The first thing I knew Mar[illegible]
[illegible] life [illegible]
[illegible] kn[illegible]
[illegible] in the [illegible]

[illegible] fam[illegible] area soon bec[illegible] [illegible] by
World War II [illegible]
[illegible]
[illegible] of Olorgesailie, southwest of Nairobi. T[illegible]
he was an old Afr[illegible] [illegible]

[illegible]

[illegible]

[illegible]
[illegible] Olorgesailie [illegible]
[illegible]

[illegible]

[illegible]

[illegible]

[illegible] [illegible] National Park in Uganda [illegible] Richard Leakey has spent most of his life in the East African bush. A wildlife expert, he conducts photographic [illegible]

[illegible]

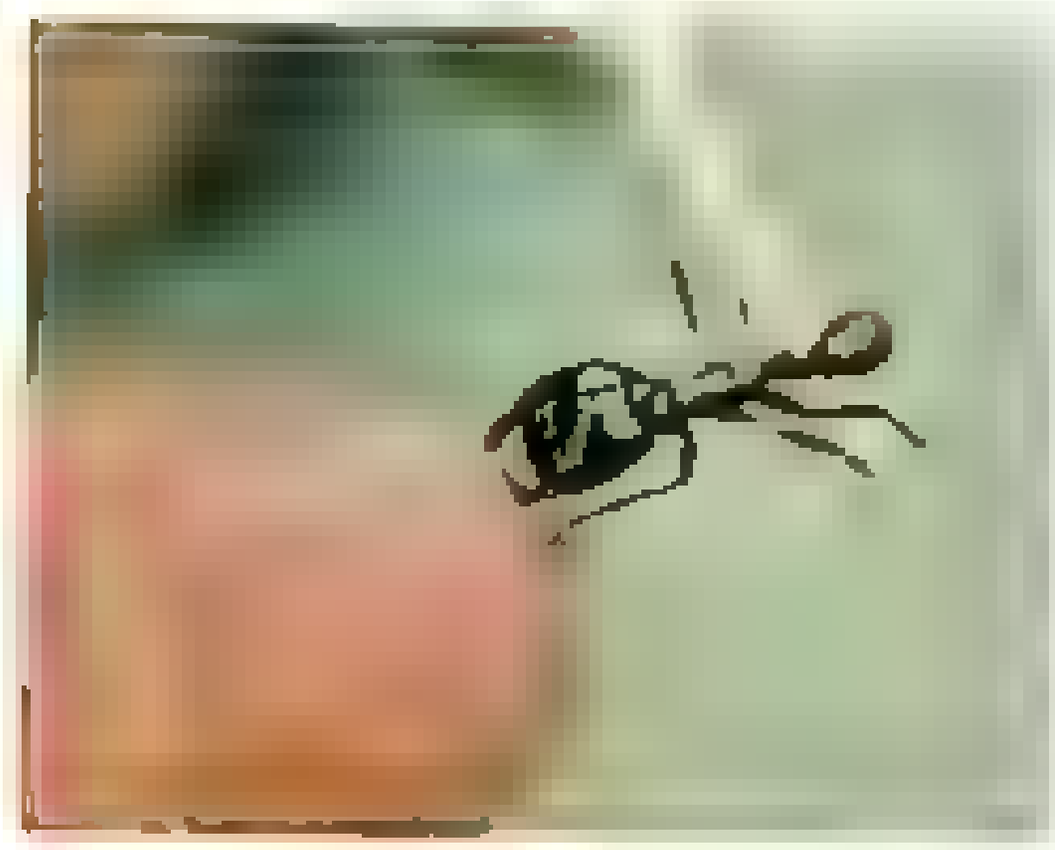
Army ants on the move [illegible]

in search of food [illegible]

[illegible] the other side of the [illegible]

[illegible] force [illegible]

workers [illegible] small chunks [illegible]



[illegible]

[illegible] see aspects of Africa [illegible]

[illegible] of [illegible] about our incredible small [illegible] expedition. I attempt to present a [illegible]

[illegible] exist nowhere else."

Richard was guiding a crew of National [illegible]

[illegible] television documentary on Africa. They [illegible]

Place, probably the most magnificent [illegible] of the entire continent.

Jonathan [illegible] company. He [illegible]

near Lake Victoria. His passenger was four feet of malicious temper known as a puff [illegible]

[illegible] But then Jonathan's friends are not even [illegible]

We cleared a space in the center of camp [illegible] Jonathan to demonstrate the technique of milking a snake for venom. With the he[illegible]

[illegible]

tund one the stars. "When I got to the labora-
[illegible]
tant. But he was making shaky notes all the
me on his reactions. He was grey and [illegible]
[illegible]
is sensations.
[illegible] see the results we concluded nothing
[illegible]
[illegible] down everything he
[illegible] heart's beating very
[illegible] readable is much
[illegible] used to be

Both Jonathan and Richard [illegible]
[illegible]
cial weeks each season h[illegible]
their parents. Jonathan discover[illegible]
[illegible]
found the most known power pay of *Zaman*
Mopas [illegible] west. The
[illegible]
directed by Richard and Dr. [illegible]
assistant, Edwin Isaac [illegible] National Geographic Society sponsor[illegible]
To my delight, Richard invited my wife

[illegible] Mesa Verde National Park [illegible]

[illegible]

[illegible] to the kill of a snapped [illegible] meat. [illegible] hard [illegible] toward them with a flash [illegible] darkness.

[illegible]

[illegible] I could hear the sound of flesh [illegible] and the crunching of [illegible]

the hyenas [illegible]

[illegible] two further back [illegible] knowing its [illegible]

[illegible] great brown [illegible]

[illegible] can be a rifle away, until only three or four remained. Suddenly all leached off [illegible]

[illegible] course, [illegible] be an [illegible] photograph.

Richard and I walked over to where the Masai stood above on the skyline. The [illegible]

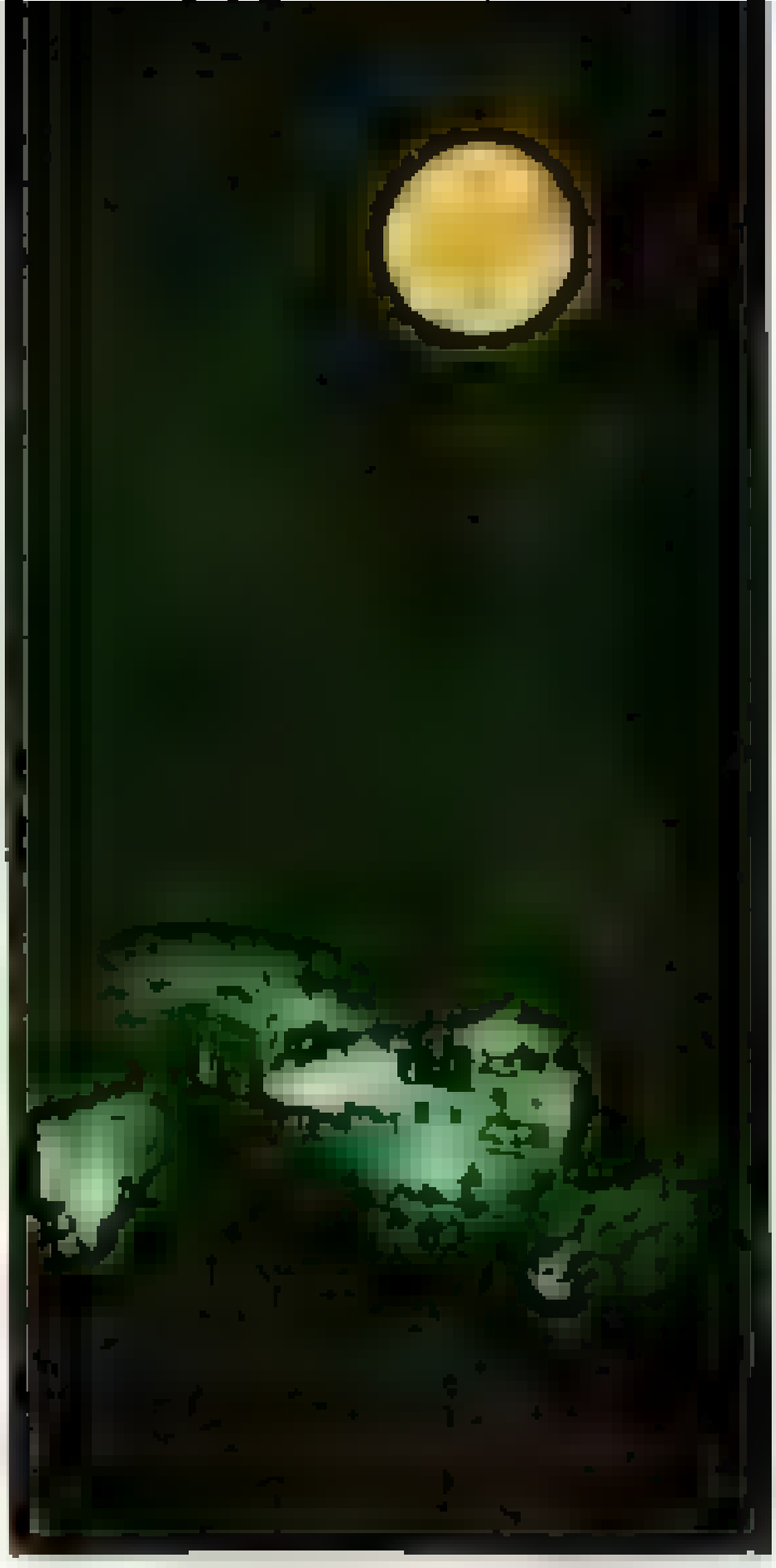
High-stepping and haughty, ostrich parents [illegible]

Frisky colt [illegible]

W

Time Turns Back in Picture-book Portofino

By CARLETON MITCHELL



[illegible]

The terrace of his villa, with the [illegible] harbor spread [illegible] President [illegible] equivalent to commodore else[illegible] Yacht Club [illegible], and organizer of sailing events in the 1960 Olympic Games. [illegible] is not only one of Italy's [illegible] sportsmen, but also a leading Portofinese.

Some [illegible] saw that what was happening to other towns along the coast would [illegible] here next: big hotels, tiers of villas up the mountain, the old houses pulled down to make room for [illegible] apartments. So, in [illegible], the government was persuaded to make Portofino a national monument. Any [illegible] must be approved by a com[illegible].

"Is permission often granted?" I asked, knowing he was chairman of the official body that protects Portofino.

[illegible]

[illegible] Castello Brown [illegible] the [illegible] (page 236). If [illegible]

[illegible]

And what [illegible] with [illegible]

BLESSED BY THE SEA [illegible] by the [illegible] Italian [illegible] Portofino [illegible]

SYMBOL OF THE SEA— [illegible] the ancient Romans [illegible] Portus Delphini, or Port of the Dolphin.

He gave an eloquent shrug. "For that we already have waiting the paper saying 'no.'"

Thus the [illegible] Portofino [illegible] modern [illegible] leaving the village as it was in [illegible] centuries. Not even a shutter can be repainted until the [illegible]

[illegible] where tw[illegible]

whose livelihood comes from the tiny shops under the ancient Genoese arches around the piazza? In all the crowded Portofino, and the squeeze for space, where would they have gone, and what would they have done?

There can be no certain answer to these questions. But it is safe to say that the townspeople would not be living very much as did their ancestors. Yet they do. Portofino retains its [illegible] simple Italian village. Watching, I have often been reminded of an ocean pool. A visitors' stream [illegible] during the late morning and [illegible] at night, and [illegible] the tide may sometimes flood almost to overflowing, when it ebbs the pool is the same.

Come with me a day in Portofino, a day similar to many I have spent over the past eight years, and I will try to show you the heart of this village as I know it.

CLASPING THE JEWEL, [illegible] *visitors who travel the cliff-hanging highway from Santa Margherita Ligure must park on the outskirts: Portofino [illegible] its winding streets on foot.*

PENDANT *on the necklace of villages that run the Riviera di Levante, the Coast of the Rising Sun, Portofino is a fisherman's view opposite from Castello Brown.*

I arise early because the town does. The sky is lavender to clouds [illegible]. Choosing a seat at a table in the corner of the piazza, I watch the first rays of the sun gild [illegible] parish church [illegible] while night still lingers on the slopes behind me. Yachts along the quay are like sleeping [illegible]. Then the sun fingers [illegible] the [illegible] of the [illegible] and faded plaster with the [illegible] of renewed [illegible].

[illegible] Mario Baffi [illegible] is the first of the *marinai*, the boatmen [illegible] [illegible] famous and respected as the great [illegible] of [illegible]. His [illegible] have [illegible] more white [illegible] with [illegible] the twinkle in his eye.

"*Buon giorno, signore,*" he calls to greet us. We have been friends since [illegible] when he acted as my water taximan between *Finisterre* and the quay. Now he [illegible] trousers and jer[illegible] [illegible] but Mario [illegible] with [illegible] and [illegible] a floppy white tennis hat.

"How goes [illegible]?"

"The motor," he [illegible] and [illegible] a violent gesture with a [illegible] finger across the throat. Mario prefers the ancient and [illegible] Mediterranean method of rowing with heavy sweeps, standing up and facing forward, to an [illegible] on the stern. He regards the motor as a deadly enemy, and it responds by frequently going on strike. As he works [illegible], his bare feet make tiny [illegible] sounds on the [illegible] through the centuries.

AT THE SAME TIME [illegible] begin to swing [illegible]

[illegible] small grocery. No mass production and distribution here. Each pear-shaped tomato, waxy red at [illegible], [illegible] green [illegible] before [illegible] of the arrangement. The [illegible] called *[illegible]*, the *[illegible]* and [illegible] the [illegible] same [illegible] attention. So does [illegible] yellow peaches [illegible]

[illegible] my world [illegible]

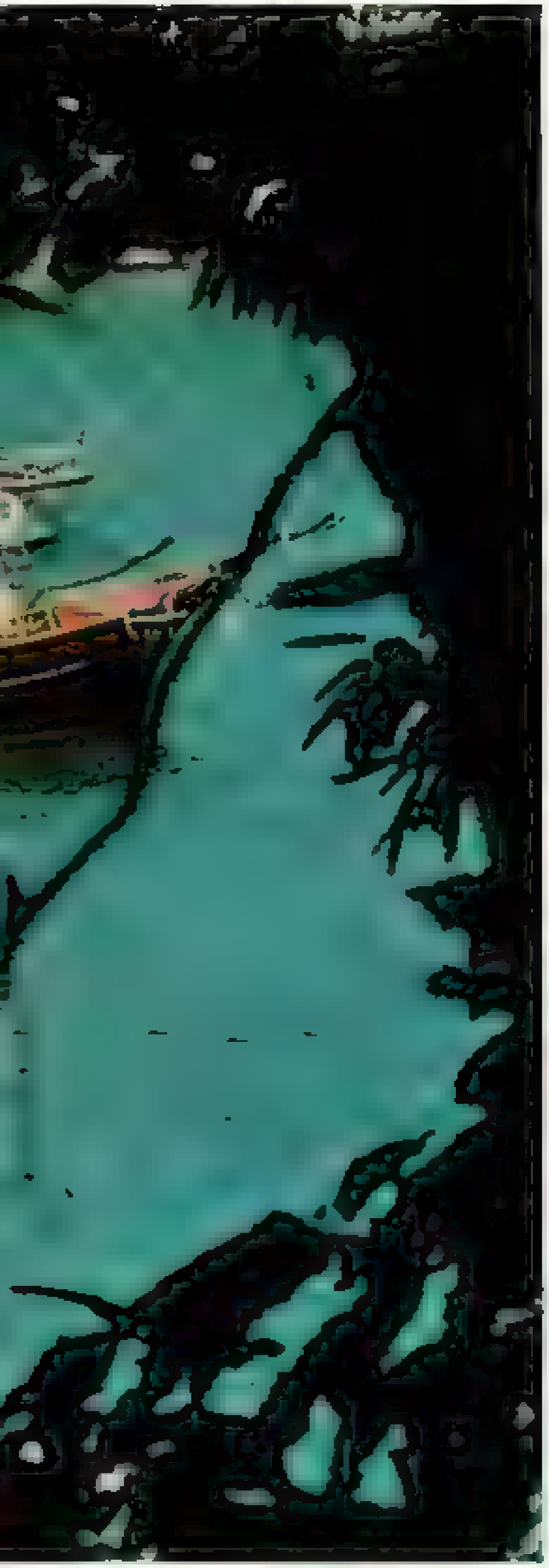
[illegible] men stained chocolate brown from a lifetime on the Mediterranean [illegible] of [illegible] stemming back to the [illegible] perhaps beyond. Now [illegible] everything else is the same.

[illegible] the boats [illegible] down the slope from [illegible] tots of [illegible] dancing beside their fathers, [illegible] of [illegible] when they [illegible] on the [illegible] water.

At seven a *carabiniere* in uniform [illegible] the narrow street bearing [illegible] the [illegible] the chain. Portofino is official[illegible]

[illegible]

[illegible]



[illegible] the Church [illegible]. Small trucks, some tricycles, [illegible] the piazza. Bent old women in black [illegible] baskets down on the [illegible] to gesture with their hands. As [illegible] talk, they make way for Gino, the street sweeper, who has already begun his morning task of clearing the cobbles with [illegible] broom of stiff twigs bound to a staff.

As I eat a breakfast of coffee and rolls, there is a cl[illegible] hoofs from Via Roma, and the morning mule train appears from the mountains above. It is the only way heavy s[illegible] taken to villas perched high over the [illegible] steep slo[illegible].

At the same time, a ch[illegible] soars from the twisting mosaic path below the Church of San Martino (page 23). I recognize the [illegible] clear voice of M[illegible], the fish peddler. *"Pesci! Pesci!"* she [illegible] the dialect [illegible] *"Boghe! Anciue be[illegible]!"* "Fish! [illegible] Bogues! Anchovies beautifully fresh!" Now [illegible] nears, pushing her cart and followed by cats like a Pied Piper as she crosses the piazza to the shade [illegible] beside Ristorante Delfino (page 24).

Upper shutters have been swung back. B[illegible] is spread on window sills and laundry clipped to lines between them, a practice [illegible] the town fathers, but some habits die hard. [illegible] ladies fold their arms comfortably on the [illegible] sunshine and lean out of windows to talk [illegible].

From previous visits to such centuries-old houses I picture the interiors hidden from the casual visitor. I remember climbing [illegible] like Palazzo B[illegible] by the [illegible] doorway. I slid my fingertips along the smooth plaster on either side until I reached [illegible] stairs, where my questing finger touched the wood of a door.

Inside the apartment it was still dark. Because houses had been built together medieval fashion, shoulder to shoulder, there are no side windows. Light enters only at front and back. Electricity [illegible] recent innovations, they are regarded [illegible] and used sparingly. Heavy dark furniture makes the dwelling more somber, relieved only by religious pi[illegible].

IN [illegible] families to a floor—size is measured by the number of windows overlooking the piazza. "A 'one-window' [illegible] about [illegible] feet wide," [illegible] 'two-window' house twice that. So you can see that a one-window apartment is like a [illegible] narrow, deep cave. That is why they [illegible] spend a lot of time looking [illegible].

I remember also a visit to the rooms of M[illegible] and [illegible] Franco Mazzo[illegible] and his beautiful wife [illegible] apartment. Black [illegible] had vanishing fireplaces [illegible] graphs covered the walls, while a gleaming kitchen [illegible] stained cupboards. Scattered magazines, a hi-fi [illegible] furniture between the [illegible] overlooking the piazza [illegible].

N[illegible] *[illegible] Portofino [illegible]*

[illegible] and [illegible]

maker [illegible] her baby [illegible]

[illegible] fingers still quick [illegible] she [illegible] Queen Elizabeth I [illegible] much prized such lace from [illegible]

[illegible] and here Br[illegible] spends much of her time, like the other [illegible] of Port[illegible] [illegible] on the scene below.

A[illegible] from Via Roma sounds the [illegible] shoe beats on stone, and the [illegible] cart of Pip[illegible] the [illegible] begins [illegible] while the town completes its morning transformation. The Porto-finesi have [illegible] of [illegible] are arriving in the pockets [illegible] visitors. [illegible] as [illegible]

On the doors of shops are draped the creations of P[illegible] and other Italian designers, [illegible] printed [illegible] blouses and [illegible]. Postcard stands are set [illegible]. Counters are washed in the [illegible] serving ice cream in its endless varieties while the vendor of *frutti di mare* [illegible] of [illegible] its blue [illegible] and in the shade arranges [illegible] and sponges [illegible]

Nearby I notice [illegible] old man, gossiping and perhaps splicing [illegible] of rope, waiting for what the [illegible] will soon bring.

"Boat, mister? *Barca, monsieur? Barca! Boot! Boot* [illegible] *Herr*!" they will then ask softly [illegible] [illegible] of the visitor. "A boat for San Fr[illegible]"

AS I SIT BLINKING, the captain of the port goes by, [illegible] in a white uniform festooned with [illegible] at the shoulder. He is a true [illegible] who [illegible] directs the [illegible] of the port from [illegible] at the entrance, blowing whistles and [illegible] [illegible] electric [illegible]. Now he has an[illegible] business on the far side of the harbor [illegible] to find space for visiting yachts that converge [illegible] the flags of every nation of Europe, plus a few with the Stars and Stripes of [illegible]

[illegible] towering *Quadrifoglio*, a contender in 1930 for the America's C[illegible] [illegible] the vessel that can find space along the quay, [illegible] the local [illegible] [illegible] far, as though content to remain forever in the [illegible]

As I watch the captain [illegible] I am almost [illegible] [illegible] on the boats, brought to a high [illegible] retire to breakfast on red wine, bread, and cheese [illegible] [illegible] as the sun passes over [illegible]

Around me tables fill as local customers sip a [illegible] morning coffee [illegible] the flow of sightseers begins. Signor [illegible] [illegible] and [illegible] several books, and I ask him to sit so I may learn more of the history of the [illegible]

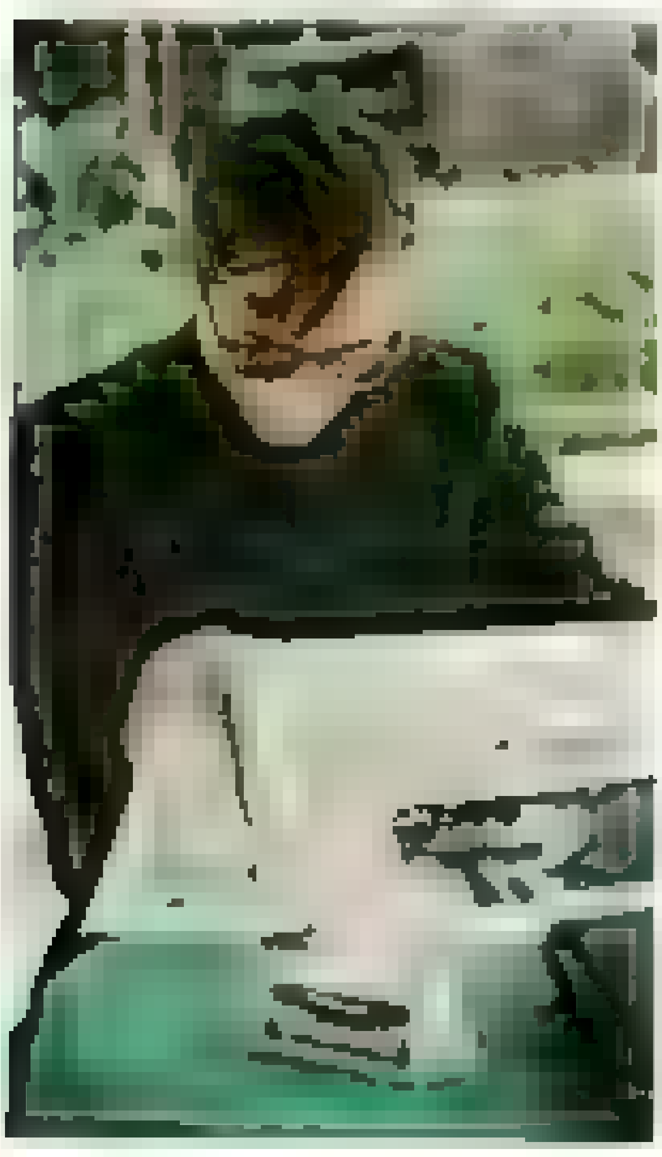
"The origin of the name Portofino?" he repeats. "It stems from the Roman Portus Delphini, which later in Italian became Porto [illegible] or Port of the Dolphin. Some think such fish were [illegible] here. But I have a different theory."

T[illegible] he sketches on the table cloth [illegible] Record. Her

AWASH IN A R[illegible] TIDE

[illegible] hours [illegible] the lapping oars of a [illegible] back at sunrise.

But the world intrudes on [illegible] of a sidewalk cafe [illegible] after a ride



is the shape of the peninsula that forms the harbor. This end is Castello Brown; the other end is there, under the Church of St. George. As we see, the land has exactly the curved form of a dolphin leaping from a wave under the bow of a ship.

He finishes his coffee and rises. "Would you like to walk up to the church? You can see it better from [illegible]."

We pass the alley where Maria's fish have been [illegible] beggars as well as cats and [illegible] into a steep, stone-paved path, shaded and patterned by purple bougainvillea. At the top is a small [illegible] in front of a tiny stone church. One side overlooks the town, the [illegible] Mediterranean [illegible] out over the sea as a white flag. Behind the church is a Cross of St. George.

Sailors from Portofino brought back some bones that [illegible] to be those of St. George from the Holy Land during the Crusades, explains Signor Gotta. "The remains are still here. Each Year the reliquary is carried through the streets followed by the in[illegible] praying for protection."

Inside the church are [illegible] models of wooden [illegible] stron[illegible] and for such venturing forth on the sea. Painting on the wall [illegible] epic [illegible] wheel steamers beset by mountainous waves or among coral rocks. In one painting St. Ge[illegible] a rock looks down from [illegible] symbolically saving the [illegible] smoothes the stormy waters in answer to prayers.

Why does the Royal Navy of Great Britain use almost no [illegible] ships?" I ask Signor Gotta.

He shrugs. "Some Genoese say it is because there were Lazzaroni sailors in the [illegible] of Kubar, the Lazzaretto, who stopped in Portofino on his way to the [illegible]. Or perhaps it was because Genoa was a great maritime power when Britain was [illegible] towel. No one battle or rock [illegible] the Cross of St. George in Mediterranean waters. Others believe it was part of a commercial agreement, as the Genoese were great traders and bankers."

Lord Byron, of course, has his own version of the story.

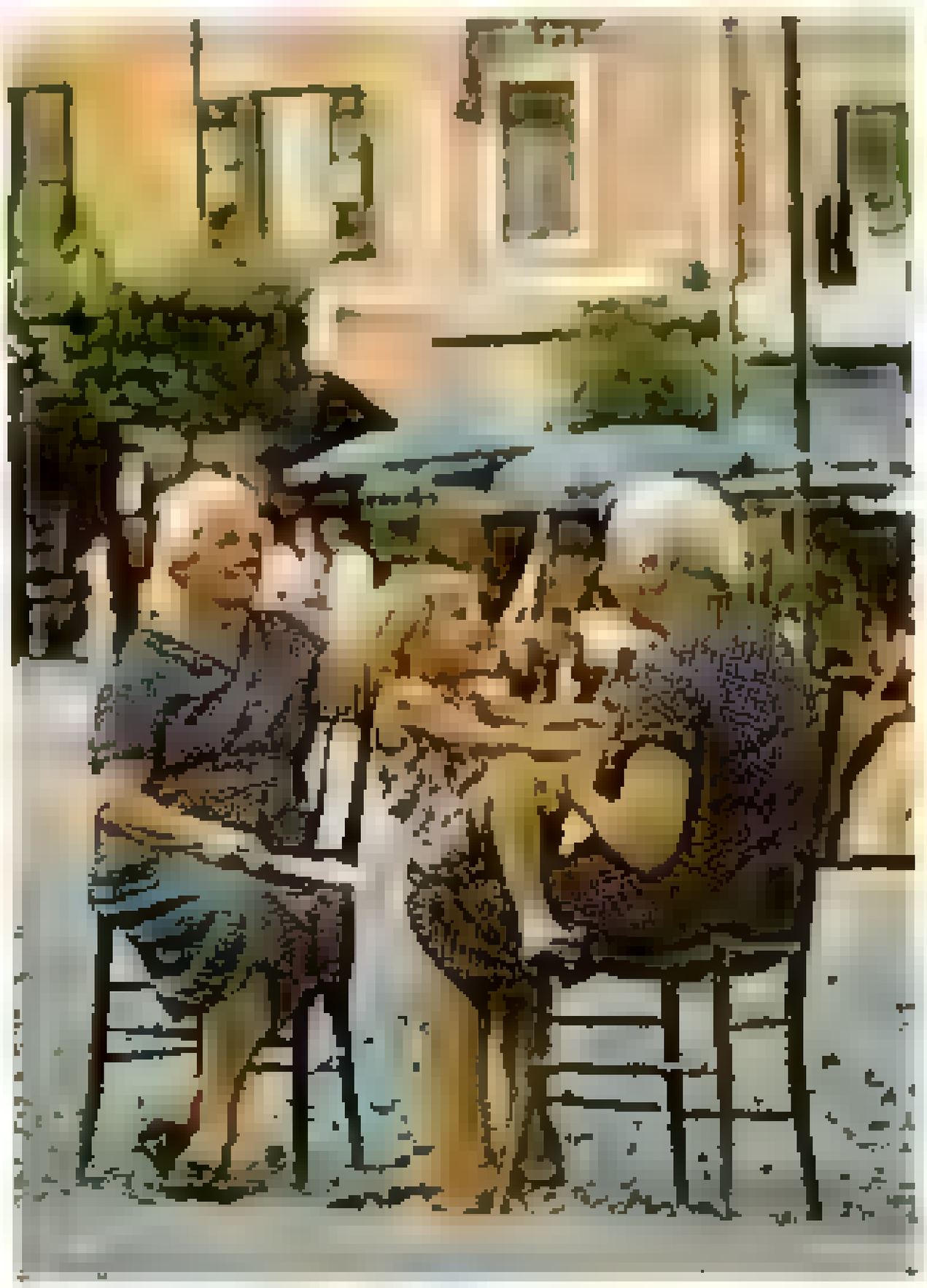
AS HE TALKS, we stroll the piazza in front of the church [illegible] between the shape of the peninsula and [illegible] dolphin. Reluctantly Signor Gotta returns to his office, while I climb the path to Castello Brown, pausing at a [illegible] wo[illegible].

The outer gate is locked. My knock echoes [illegible].

Finally a dog barks, and a woman [illegible] the door a crack. She explains that the castello is not open to visitors, but [illegible] to me when I [illegible] from Signor Gotta. I find a tower of brown stone in a setting of flowers.

Once part of a chain of fortifications protecting Genoa [illegible] Saracen attack, the tower was made into a dwelling in [illegible] shortly in the 1500s. Its name was Brown, and it has ever since been called in the odd Italian-English mixture of Castello Brown.

Once inside I find the usual hospitality of the Italian. My guide tells me she is the widow of Conte Carbarino, whose family have been custodians of the castle for three generations.

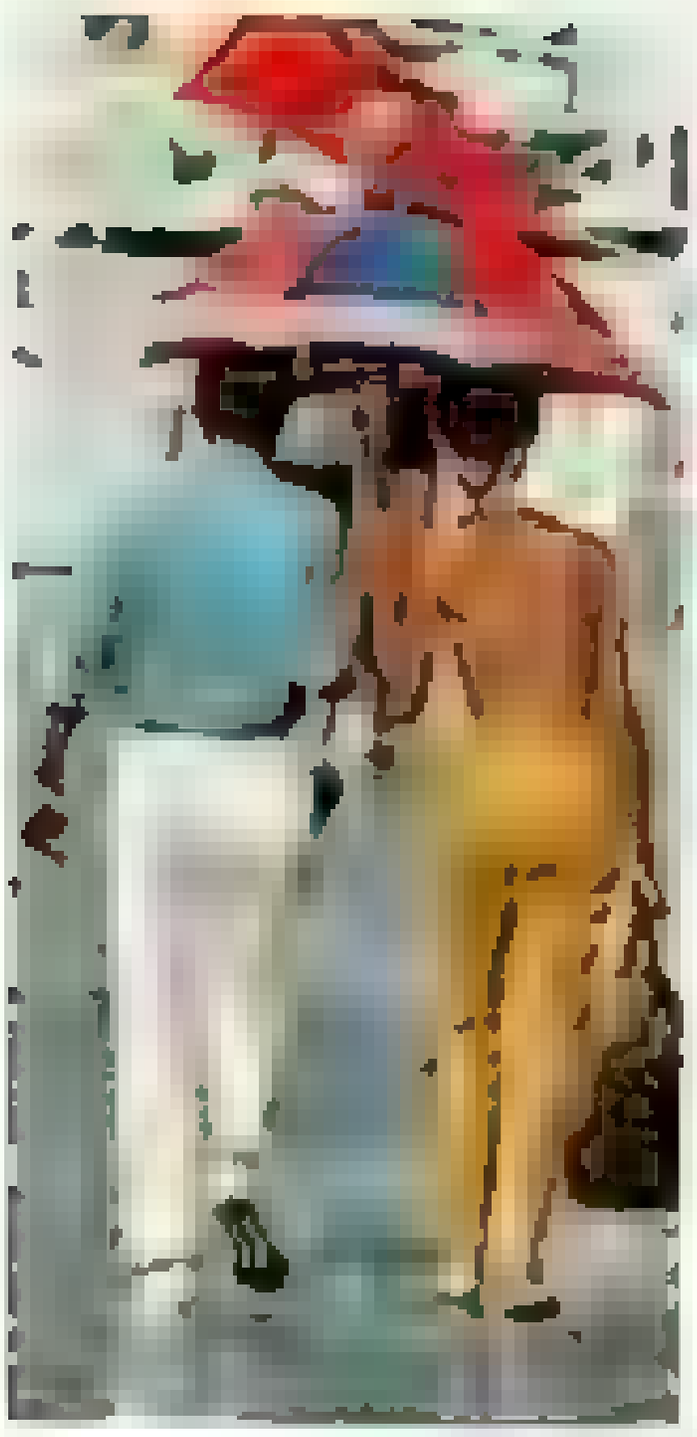


"I came to the castello as a girl [illegible] years ago, and I never wanted to leave," she tells me as we stroll a path bordered by [illegible]. "But my son plays clarinet in an orchestra in Rome, and my daughter is married to an aircraft technician. They do not wish to become *custodi del castello*, so perhaps I must go."

As we pause to look out over the shimmering water, I sympathize, remembering a story told by Signor [illegible] of a retired Englishman forced by circumstances to sell a nearby villa and take a smaller house behind. Unable to bear the thought of parting forever from the view he thought the most beautiful in the world, he had a clause inserted in the sales contract granting him "the right of sunset." Thus at the close of each day [illegible] as he lived, the Englishman was free to stand on his former terrace and watch the sun sink into the sea.

I walk through the [illegible] rooms, most bare of furniture, for since the castle was bought by the municipality of Portofino to use eventually as a museum, no one has lived here. Floors are of stone, and the windows reveal the thickness of [illegible] walls built to withstand siege.

Then suddenly I am on a terrace overlooking the whole of the Golfo Marconi, a sweep encompassing the towns of Santa Margherita and Rapallo and the amphitheater of mountains forming one of the loveliest panoramas of the Italian Riviera. I see Renzo Crosa's villa on the opposite point, while below me harbor and town [illegible] more than ever like a stage set (page 248).



[illegible]

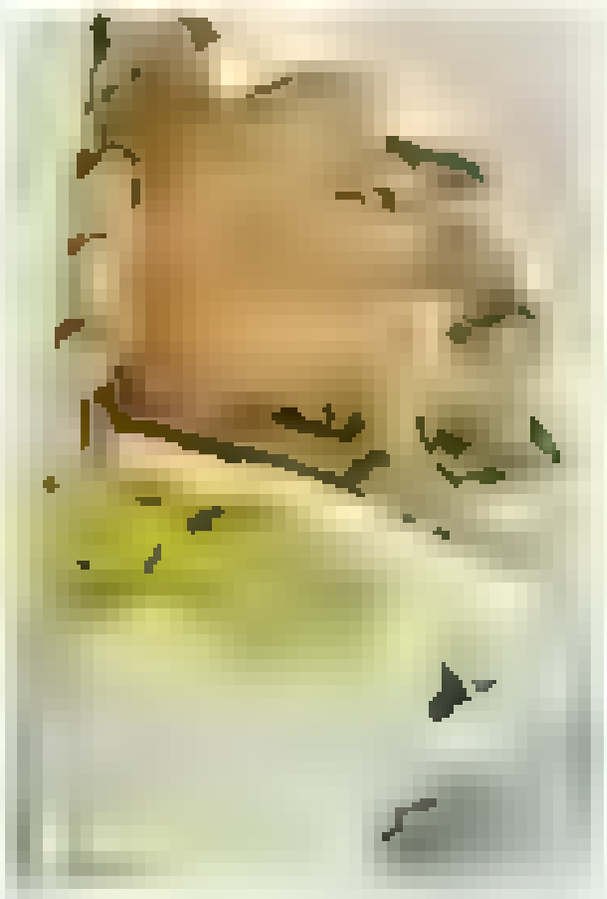
WHEN FINALLY LURED back to the piazza by the heat and to table under the umbrellas, I find the tide of visitors in full flood. Excursion boats shuttle to San Fruttuoso, a smaller inlet hidden around the corner of the peninsula, or to Santa Margherita. Shops are busy. Waitresses dart back and forth carrying steaming platters of *lasagne al pesto*: pancake-size squares of freshly made pasta covered with a dark green sauce of herbs, cheese, olive oil, and crushed pine nuts.

Crowds flow around the quays, talking, laughing, eating, drinking, gesturing with a vivacity and [illegible] that could exist only in Italy. As a friend once commented, "There is something in the air that makes everyone behave like an opera singer."

After lunch, the press of visitors thins. I see the pink shirt of Nando the tailor [illegible] moving among the tables [illegible]. From a [illegible] over a [illegible] he is able to [illegible] endless variety of fishermen's-style clothes. I stop him once, not because I need another shirt, but because his gestures [illegible].

Nando is not old Portofinese, having arrived only after the war, but he has become part of the local cast. [illegible] his nickname [illegible] Naples, and that [illegible], he [illegible] an outsider.

N[illegible] has lived for 55 years in the house [illegible] *La Grotta*, she makes her



North Toward the Pole on Skis

BY BJORN O. STAUB

MUZZLEN DOWN LAWS GREENLAND *Cramponed boots*

G


U. S. S. R.
NORTHLAND
NOVAYA ZEMLYA
FRANZ JOSEF LAND
ZEMLYA FRANTSA IOSIFA
ARCTIC OCEAN
ELLESMERE ISLAND
KANDRASMUSSEN LAND
Peary Land
Hayes
GREENLAND
Peterman
BAFFIN BAY
EXPEDITION ROUTE

[illegible]

[illegible] earthquake, yet with a range of forces — pow[illegible]

We [illegible] published our [illegible], on April 23, [illegible] to [illegible] north of Canada's [illegible] Island, on a head[illegible] [illegible] South Pole expedi[illegible]

[illegible]

Icequake Forces a Retreat

Without the Arctic sun flooding the spring nights, we would have seen impressive [illegible] cross the heaving floe, see sky [illegible] of the surrounding lines as [illegible]

Pushing the sleds in the [illegible] we strained [illegible] as loading docks in a gale. Tents, sleep[illegible] stoves, all lashed together in the heavie[illegible] [illegible]

[illegible] worries, the sun [illegible] worked a transformation [illegible] Fatally we were [illegible] retreat. But when [illegible] seemed to come from the southwest, so we chose north.

[illegible] by [illegible] feet, [illegible] early [illegible] The pulses had [illegible] and the [illegible] continued. Once it [illegible] down among the [illegible] towers, it would be [illegible] to perish [illegible] all instant.

Straining at the ropes, we had led the sleds to the [illegible] of the floe, [illegible] 10 feet above

Breathe mask [illegible]

Reluctant sledge [illegible]

[illegible] our hopes had we achieved well beyond the Pole. With luck, we envisioned time enough for [illegible] complete traverse of the Arct[illegible] Ellesmere [illegible] Arctic islands [illegible] northernmost, Spitsbergen. I estimated the [illegible] distance at more than 1,300 miles, and [illegible] [illegible] over it at roughly three months.

[illegible] in my sleeping bag that night after [illegible] [illegible] ing the traverse, or even for reaching the Pole itself.

In a sense, I had spent years reaching that [illegible] camp on the floe. My dreams stretch back to my boyhood in Norway, when I studied the lives of great figures in Arctic exploration. Fridtjof Nansen's account of crossing the [illegible] and in 1888 had inspired my first Arctic exploration. In 19[illegible]2 with a friend, Bjørn Reese, I had traversed Greenland's ice cap on skis [illegible]

Flight Gives Preview of "White Desert"

A[illegible] Greenland, my thoughts turned to the true Arctic, that vast reach of trackless water and ice forever reshaped by wind [illegible] [illegible] expedition takes a great deal more time and men than a Greenland adventure. In the summer of 1964 I began the search.

Men were the most critical item. Here I was lucky, for Norway is blessed with a people born to the outdoors and to endurance. Yet endurance counted as only one [illegible] [illegible] [illegible] the [illegible] [illegible] ng [illegible] [illegible] general skill in [illegible] expert in [illegible] [illegible] and a knowledge of [illegible]

I assembled a team of eleven young [illegible] experienced men, including that [illegible] part of any sledge [illegible] dog team driver.

I then sought advice and support. Some of the best of both came from my friend Max Brewer, Director of the Arctic Research Laboratory at Point Barrow, Alaska. The laboratory, a civilian arm of the United States Navy, supports [illegible] [illegible] T-3 and Arlis II—that drift endlessly [illegible] polar pack and provide manned platforms for Arctic observations.

In the s[illegible] [illegible]963 I flew to T-3 and Arlis II in one of the laboratory [illegible] [illegible] of several weeks. It was my first [illegible] the world we would encounter—an unmarked [illegible] and ghostly white desert, pocked [illegible] ridges beyond count, scarred by the [illegible] [illegible] of cracks— [illegible] [illegible] res that occur in the ice [illegible]

Shakedown cruise in Oslo Fjord tests men and kayak-like plastic boats designed for [illegible] [illegible]

[illegible]

[illegible] for home [illegible] Thorat for-
row Max [illegible] other I [illegible]
[illegible] forward

"Now I have a [illegible] trip—but it shall
be a great one. Let us know [illegible] we can help."

As the starting time for the expedition
[illegible] Max and Tweedie [illegible]
[illegible] the above. In deep winter, the
pack is at its most [illegible] travel. As
[illegible] with the [illegible] and [illegible] temperatures
[illegible] northward, open leads in the ice
increase [illegible] the chances of surface travel
increase with them. But [illegible]
[illegible] of sunlight and [illegible]
night. We hoped to profit fr[illegible]

[illegible] of [illegible]

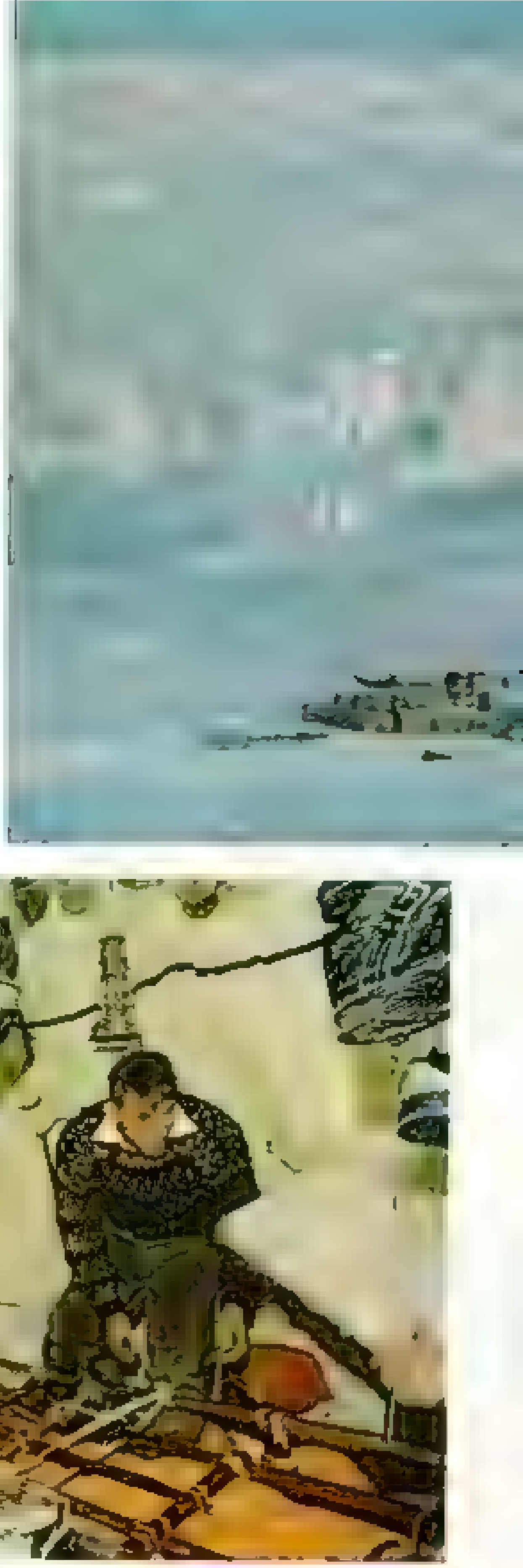
The National Geographic Society offers
as a generous grant, as [illegible]
[illegible] Norway's [illegible]
[illegible] the Swedish [illegible]
[illegible] our purpose was [illegible]
[illegible] we [illegible]
observations. Research organizations in Nor-
way and the United States asked us to ob-
serve such solar conditions as [illegible]
temperatures, [illegible] of [illegible]
and the effects of these conditions
[illegible] animals, and performance.

In March [illegible] we made [illegible]
[illegible] equipment amounted to thousands of [illegible]

[illegible]

[illegible]

[illegible]



[illegible]

[illegible]

[illegible] passed the Fourth Ar[illegible]
[illegible] deck from
[illegible]

[illegible] across the net from [illegible]
[illegible] I knew we could
[illegible] quickly. With [illegible]
[illegible] between [illegible]
[illegible]

[illegible] the last possible [illegible]
[illegible] the next day [illegible] After [illegible]
[illegible] we [illegible]

[illegible] into the net and [illegible]
[illegible]

[illegible] pleasant [illegible]
[illegible] one of the [illegible]
[illegible]

[illegible]
we have [illegible]

[illegible] 25 days. We [illegible]
[illegible] and [illegible]
[illegible] fishing [illegible]
[illegible] hours each [illegible]
[illegible] 14 hours [illegible]
[illegible]
[illegible]

We [illegible] know [illegible]
[illegible] much [illegible]
[illegible] [illegible]

picked up. The tents would [illegible] [illegible] [illegible] [illegible] [illegible] the storm.

Leaving the sleeping bags in the morning was a minor agony; each man developed his own system for dressing. I learned not to wear my ski boots until after breakfast. When I first put them on, they were frozen stiff as Dutch clogs, but in 15 minutes my feet had thawed them enough to tighten the laces.

Homemade Sleds Become Snowplows

At the end of three weeks, with 25 harrowing miles behind us, at last we broke through our barrier. Threading the worst of the coastal pack, we reached the smoother sea ice.

Our support team had left us and turned back to Alert, and now we were six on the ice: myself and my younger brother, Terje, our medical corpsman; dog driver Hans Odd [illegible]; [illegible] and [illegible], our two radio operators; and Steinar [illegible], navigator ([illegible]).

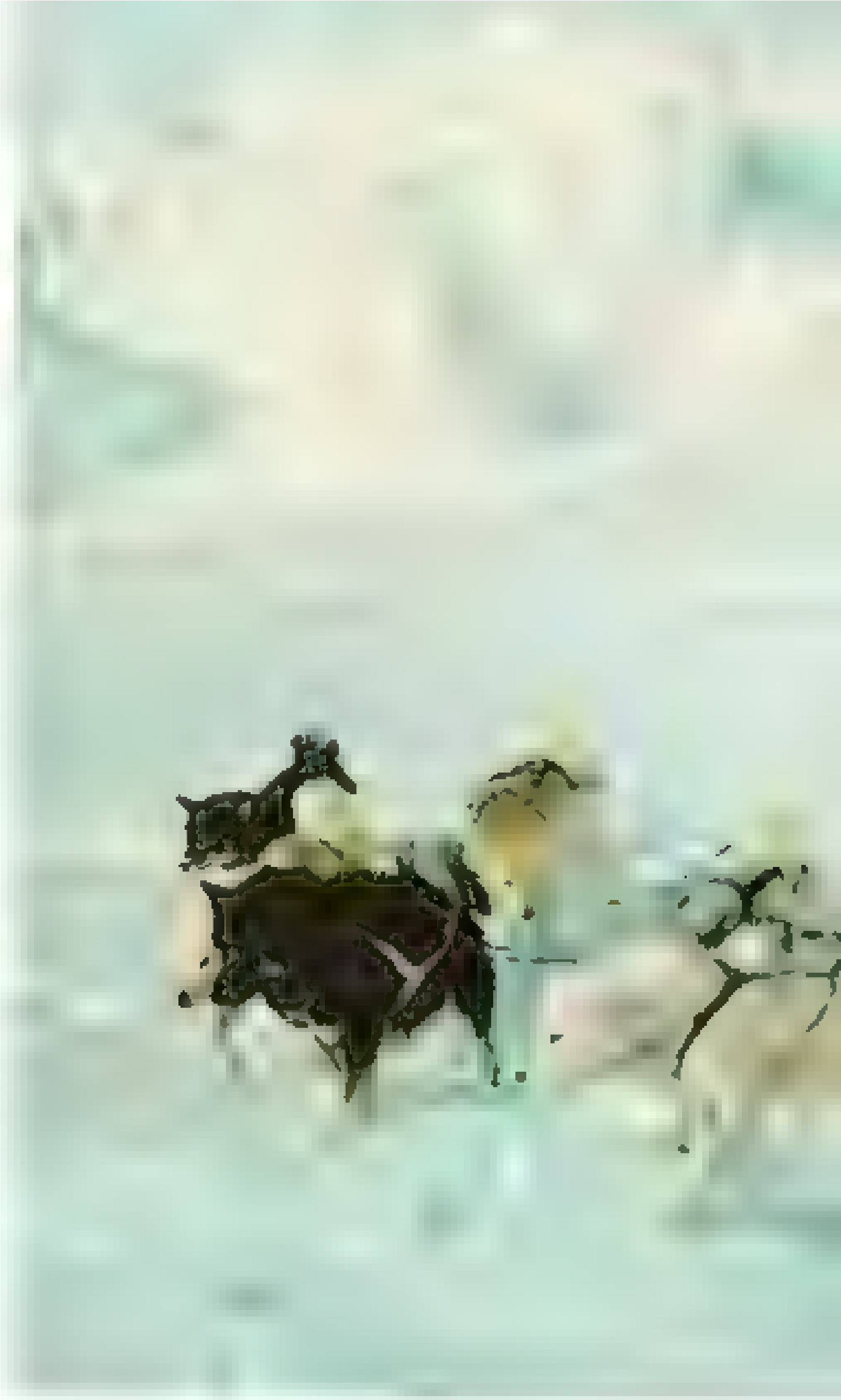
Delay had cost us heavily in schedule and provisions, and our first goal was now the ice island Arlis II. Arlis [illegible] some 2[illegible] miles north of our position, close on the route to the Pole, though of course the island shifted constantly with the Arctic pack (map, page 2[illegible]).

When the shift to the heavy [illegible] sleds at Alert had cut our carrying capacity, we had taken a calculated risk—we had trimmed provisions so that they would last us only as far as Arlis II, and left the plastic boats behind.

[illegible] we had [illegible] out was through the [illegible] [illegible] [illegible] [illegible] [illegible], [illegible] operator, had hitched a ride with a U.S. Air Force supply flight to Arlis II. With him he had carried the [illegible] camp radio, a total cargo of extra provisions, and our [illegible] boats.

Ice-floe raft ferries a [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]. Skis serve to make the improvised craft [illegible] [illegible]. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]. Toward expedition's end, the group spent a hazardous 48 hours marooned on a floe in the middle [illegible] [illegible] [illegible] [illegible] [illegible].

Frigid dunking [illegible] to halt huskies crossing a narrow lead. Dogs survive [illegible] immersion [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] speed [illegible].



[illegible]

[illegible] Arctic glacier by steam power for [illegible] arrival."

[illegible] the sea [illegible] brought it within [illegible]

[illegible] ice floes [illegible] we shouted the Eskimo [illegible]

[illegible] If we grew [illegible] the few [illegible] we encountered the [illegible]

[illegible]

Swerling Snow Stalls Expedition

[illegible]

[illegible] instead of the [illegible] we stepped bod[illegible] [illegible] last

[illegible] parties, [illegible] [illegible]

[illegible] we'd be around the other Sometimes I even managed to work [illegible] a third party [illegible] [illegible] make an argument [illegible]

While the snow fell [illegible] my brother Jerne took automobiles apart in his yard and put them back together [illegible] Odrash, the magnificent [illegible] and we dreamed up [illegible] [illegible] the day before

Once I stood a seal up a lead. In a [illegible]

Forty-one days and 300 miles of polar w

ice rifle was in my hands. Even as I sighted
. Knew it was hopeless. At that season and
rifle would not fire left
nk the instant I knew how

The last days of April came—we had struck
death on the ice. Now we ran out of
visions several. Temperature for the dogs was
shortest supply, and were it not for my
o the animals themselves it might have
ered. Crossing wounds on the trail
e. One cannot abandon a dog—
heartless to leave him to starvation or the
and, when food is so scarce, feed the
e hungry survive

I sometimes think of the Arctic as a great
frozen feature, unfriendly and unkind
for man to make a mistake that will betray
him. One day I made such a m

Fury Life

I had moved out ahead of the
recommended the trail on skis. After
only bear not ever the face
b ga The wind which
the southwest behind
d have carried the sounds more than
rule I turned into the wind and began to

Wind-frayed Snows and Streaks and
he bones great
e
n Arlis II But the expect

Dogs and men crossed from one floe to the other over the snow blanket on Arctic II

backtrack, and then suddenly a screen of swirling snow drove upon me. My earlier ski tracks in the light snow blanket over the ice had been swept away, and I could only crouch low, searching for the small pits in the ice made previously by my ski poles.

I needed both hands on my poles to steady myself and fight the wind, which now caught me full in the face. The frostbite on my face grew worse, a fine sand drawn across my cheeks and nose. But I could spare neither a hand nor time to protect myself.

Finally, through the cotton-wool screen of fog and flying snow, I heard the dogs stamping across the ice floe that had itself the expedition. I was safe, but I was to wear the mark of my error for weeks—a painful and unsightly green-and-black nose.

Sea Ice Begins to Break Up

Arctic II was now less than 1 K. miles away and at last the winds caught up with us. One morning we came to an innocent-looking sliver of water.

I crossed it easily on skis, but then it came "alive" opening and closing with the force of the wind and currents. It began to widen and I got back just in time, skipping over small ice floes that formed stepping-stones in the dark open water.

As the pack came up, the lead widened further, forming a half mile-wide water barrier stretching out of sight. Without the plastic boats, we had no hope of crossing. We could only camp until the lead closed or froze over.

"Half rations again," Lamm ordered wearily, and we settled down to outwait the ice lead.

We camped 24 hours. Then the lead began to close. The icy jaws met at last with a snap like a thunderclap.

"*Mush, mush!*" we shouted to the dogs, and in a moment were safely on the other side—or so we thought. Only when I rounded a small ridge in front of us did I realize that the ice had trapped us—we had merely stepped onto a large floe now drifting into the center of the shrinking lead.

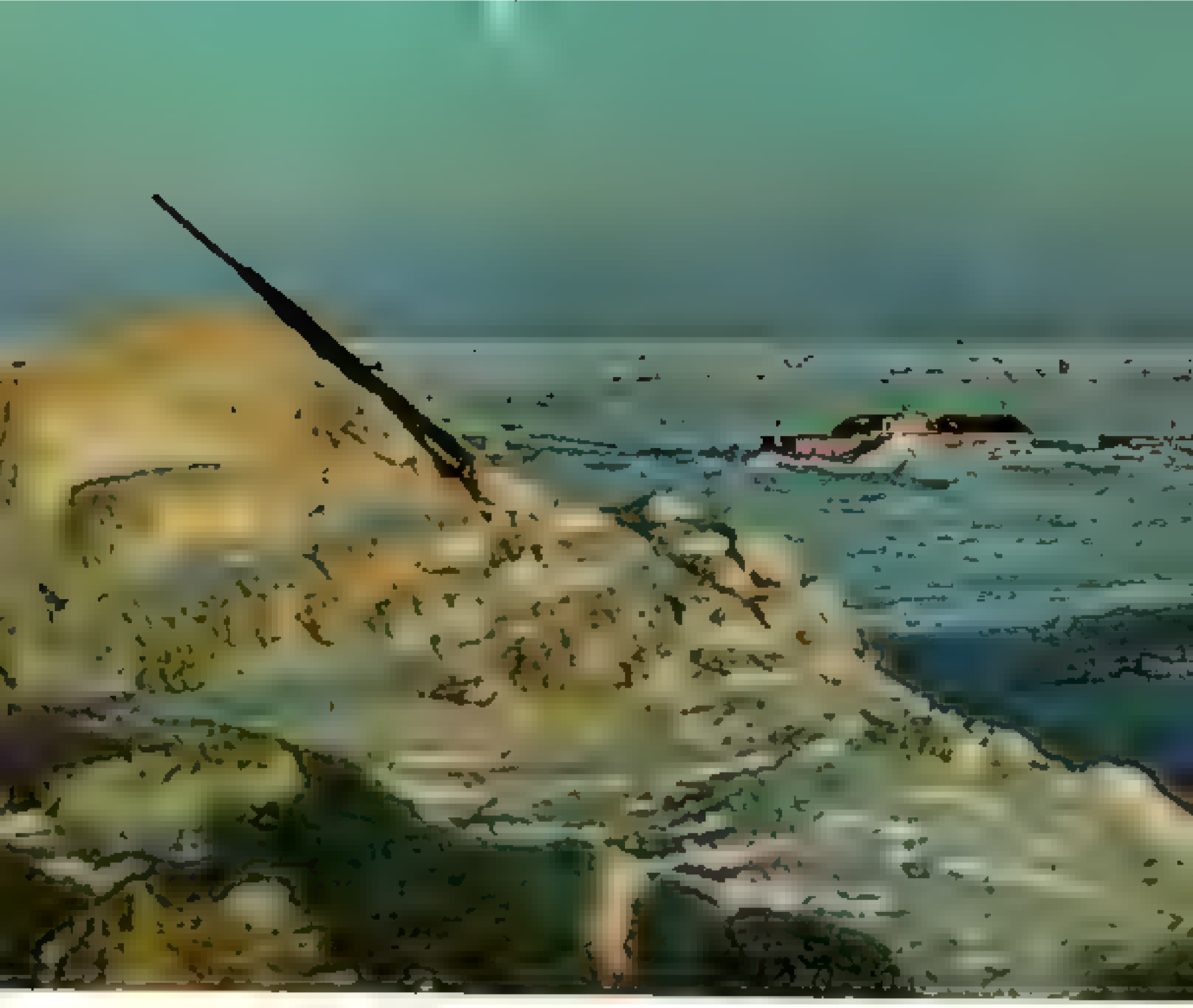
The worst dangers are those about which one can do nothing. For two days we drifted helplessly on the floe. Had a sudden storm come up, it could have exposed our ice raft or ground it to pulp beneath our feet.

Dogs can take such a buffeting at 40° or 50° below zero and recover if run at a brisk pace. But we are a man, the only cure is to put in camp at once, change clothes, and take refuge in a sleeping bag. If tents and bags get a soaking too, they become solid lumps of ice—and so, very quickly, does the man.

At the end of four weeks, we reached the northern shore of the lead. As I touched, we yelled once more to the dogs. They were afraid at first and fought our efforts. Some took a painful plunge in the slush. At last we jammed the sled, speed and weight skimming over newly formed ice hard enough to bear heavy pressure.

Our speed provided the margin of safety; a moment's stop would have brought disaster. Several times I glanced behind me and saw the ice actually sagging beneath the weight of a man and his team, so that their feet were all but hidden from my sight.

The day came when we knew that Arctic II, if Stefansson launch had calculated correctly, We were prepared for a miss. If we did not sight the ice island by evening, we would return a mere handful, crisscross of an area of about ten square miles. What we were searching for in the flatness of a gray Arctic day



End of the trail for [illegible] [illegible] While it supplies the Western Hemisphere [illegible] cannot at night match the dreaming [illegible] [illegible] Lance. There [illegible] a comatose [illegible] during an Arctic assignment for Navy [illegible]

was [illegible] by a floe but a larger, much higher expanse [illegible] had broken from a continental shelf, perhaps a century ago and had been adrift in the Arctic Ocean ever since. We would recognize it by its [illegible] would have to be [illegible] [illegible] and men.

Over tea [illegible] to the night before. Tor[illegible] room had promised [illegible] signal flare every hour on the hour beginning at noon. As each hour approached we climbed towering ice [illegible] to search for a flare on the [illegible] of a red [illegible]

At six [illegible] that night Earl Se[illegible] and I stood on a small ice peak [illegible] among the [illegible]. The hour passed again with no [illegible] [illegible] stalked down, grim [illegible] determined [illegible] search. As [illegible] reached the bottom [illegible] the ice tower the power [illegible] flooded

[illegible] ice for a little [illegible] Earl Sedlmeier of the pear[illegible] Service, threatening but [illegible] never strangle [illegible]

There [illegible] Arctic [illegible] And there [illegible] indeed, for a cluster [illegible] but [illegible] splash [illegible] marked one. As we watched, the overcast [illegible] and the dark [illegible] shell. No [illegible] now. I had a complex [illegible] After [illegible] days in the ice, Arlis II was [illegible]

Cook Grumbles, But Keeps His Promise

We arrived that evening. Max [illegible] back and the Arlis crew welcomed [illegible] Ben Tedersen. If Arlis cook [illegible] over the radio to have a steak dinner waiting, was not to be depended [illegible] chef's right to grumble. "Where [illegible] been?" he asked, shaking my hand [illegible]

South American oilbirds navigate by echo in the blackness of their cave homes

Birds That "See" in the Dark With Their Ears

By EDWARD S. ROSS, Ph.D

Photographs by the author

[illegible] a towering cliff in the Peruvian [illegible]

[illegible] real a terrified retreat. As it was, I watched [illegible]

[illegible] wide-ranging insect-collecting trip [illegible] South America, we had driven across the Andes to the upper reaches of the Amazon River. We could not pass up the chance this gave us to visit the renowned Cueva de los Guácharos—the Cave of the Owls—overlooking [illegible] near the remote Peruvian town of Tingo Maria (map, page 284). Natives of the region erroneously call the noisy oilbirds owls because of their large eyes and nocturnal habits.

The Author: The [illegible] rating bird for Johns Hopkins. Dr. Ross is best known as a [illegible] of California [illegible] of Sciences in San Francisco. He has written a [illegible] well-known order on web-spinning insects, the Embiidina. His expeditions have supported by your Society to Africa, [illegible] Asia and [illegible] Western [illegible] he has discovered hundreds of species of [illegible] previously unknown to science.

Birds Give Incense Odor for Cooking

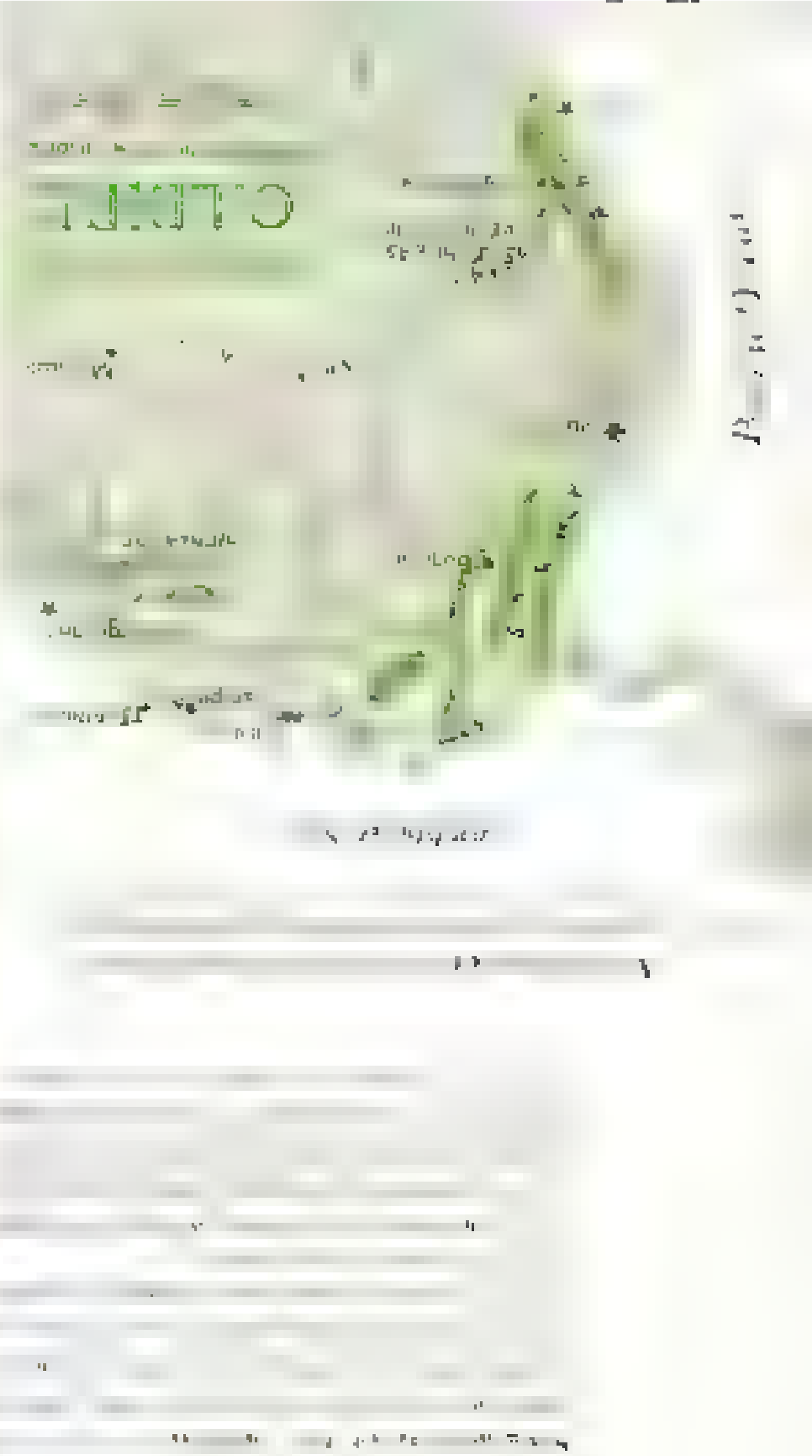
Actually, the long-whiskered oilbird is an outsize and distant relative of whippoorwills and goatsuckers, but unlike its insect-eating kin, the guácharo feeds only on the fruits of forest trees, chiefly palms and laurels. This diet gives the young birds an exceptionally fine [illegible]

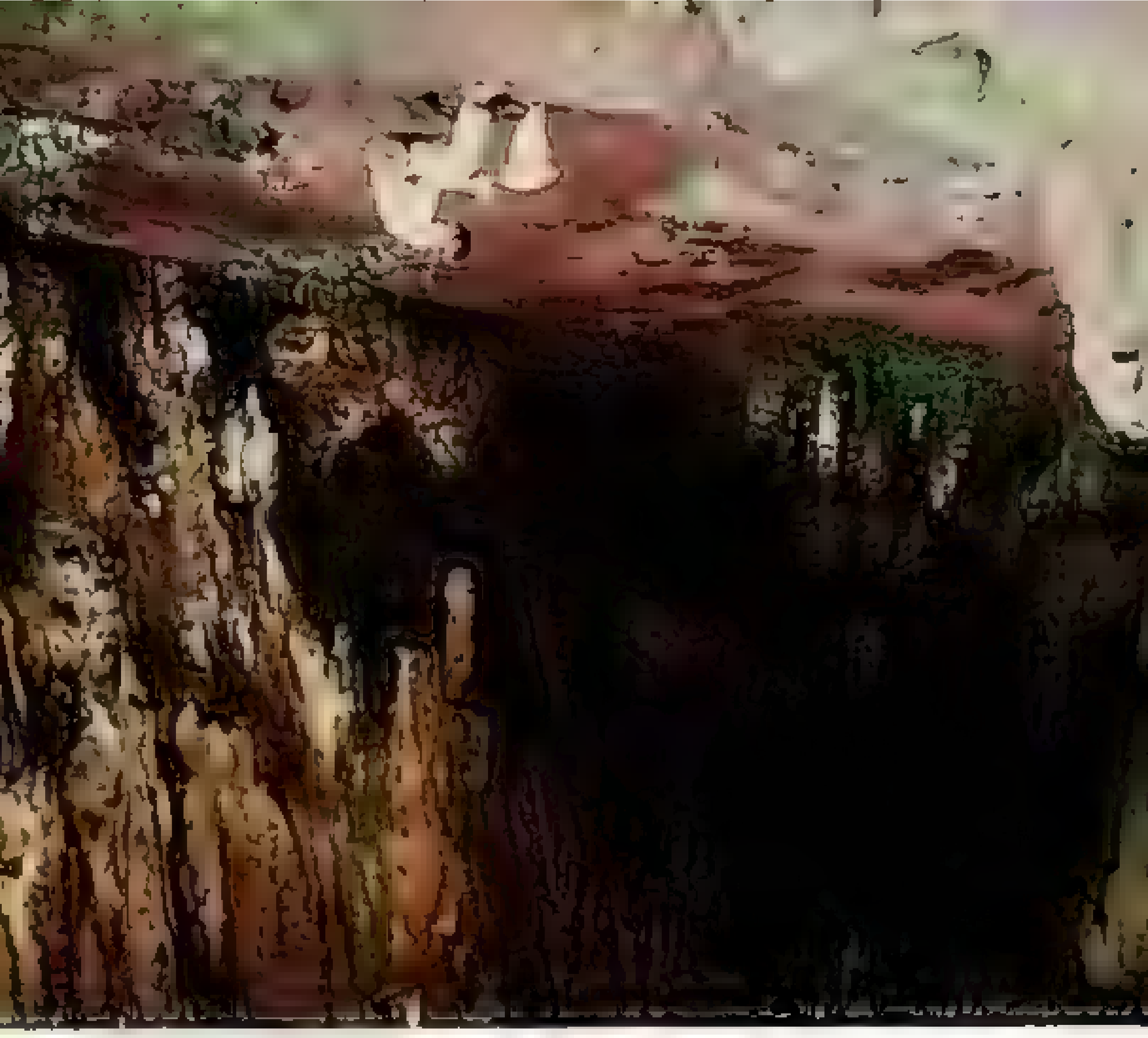
Despite protective efforts, most known oilbird caves are regularly raided by Indians and local farmers, who rob the nests of young guácharos. They boil the squabs to render fat for cooking—hence the name oilbird.

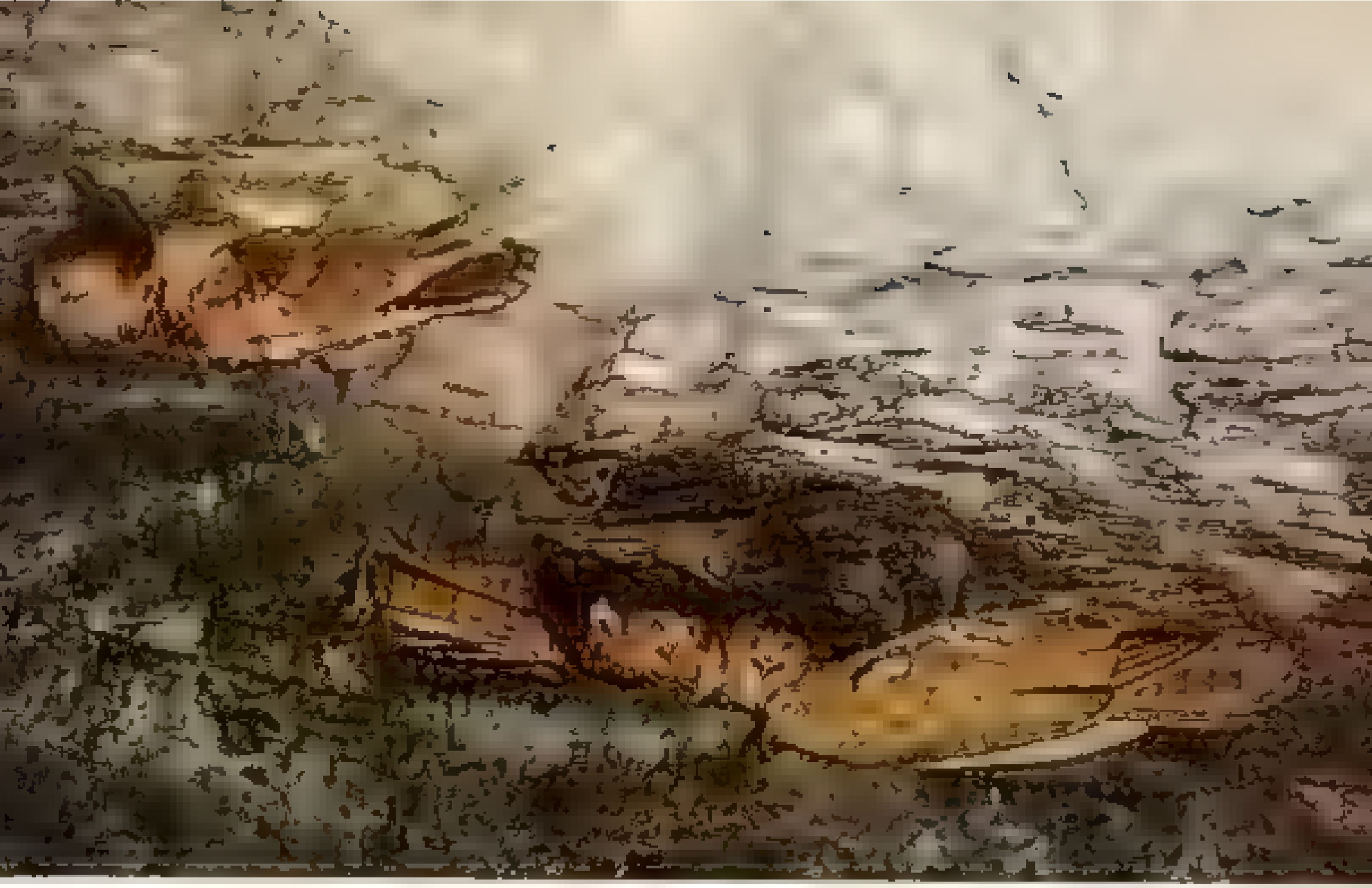
The [illegible] hooked beak, the bird snatches [illegible] fluttering before laden branches. With crop full, the adult may fly back to its nest four or five times during the night to regurgitate food in the mouths of the young. Before the [illegible]

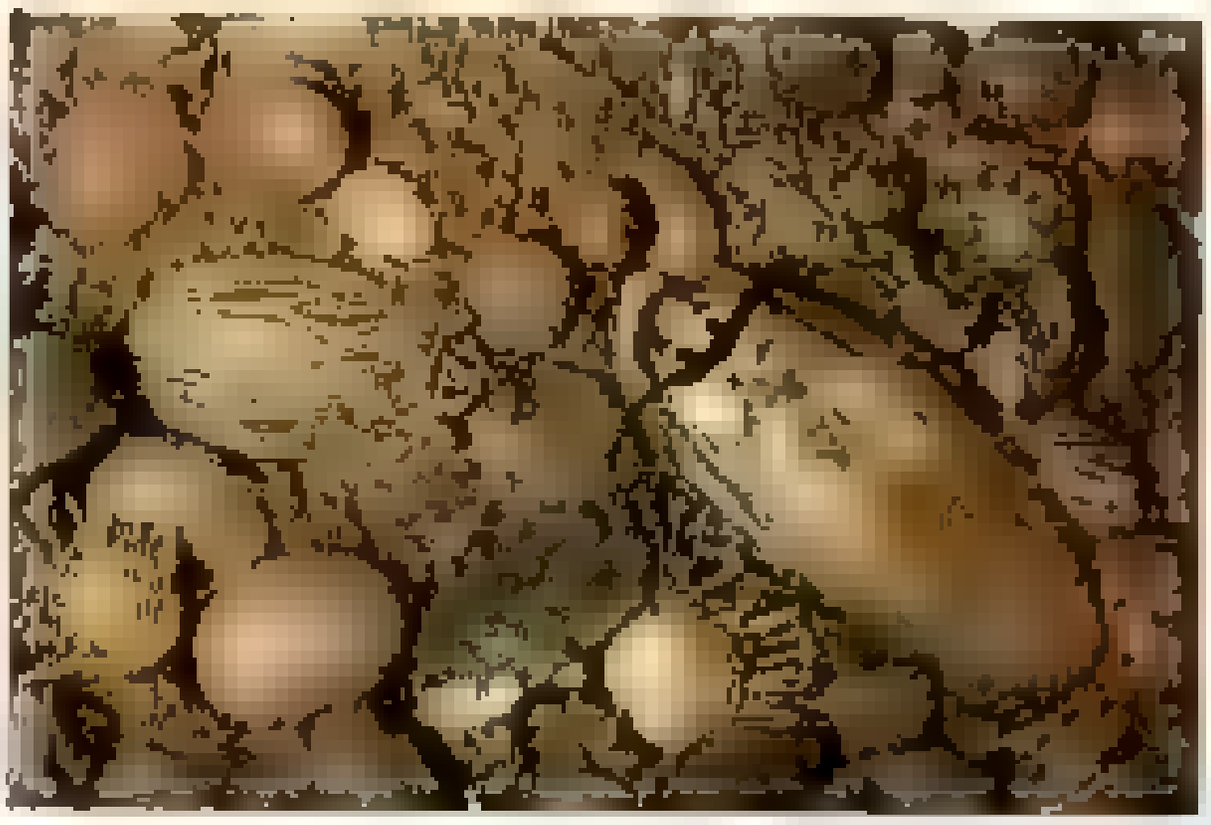
Mango & Hale, Two [illegible] Flowers in Mid-air Like a Hummingbird

[illegible] Southeast Asia's wildlife, [illegible] nature's [illegible] flower-lovers. They [illegible] from rock walls to [illegible] masters of their maneuverability [illegible] shown. Such pollen [illegible] palms and laurel from their [illegible] diet.







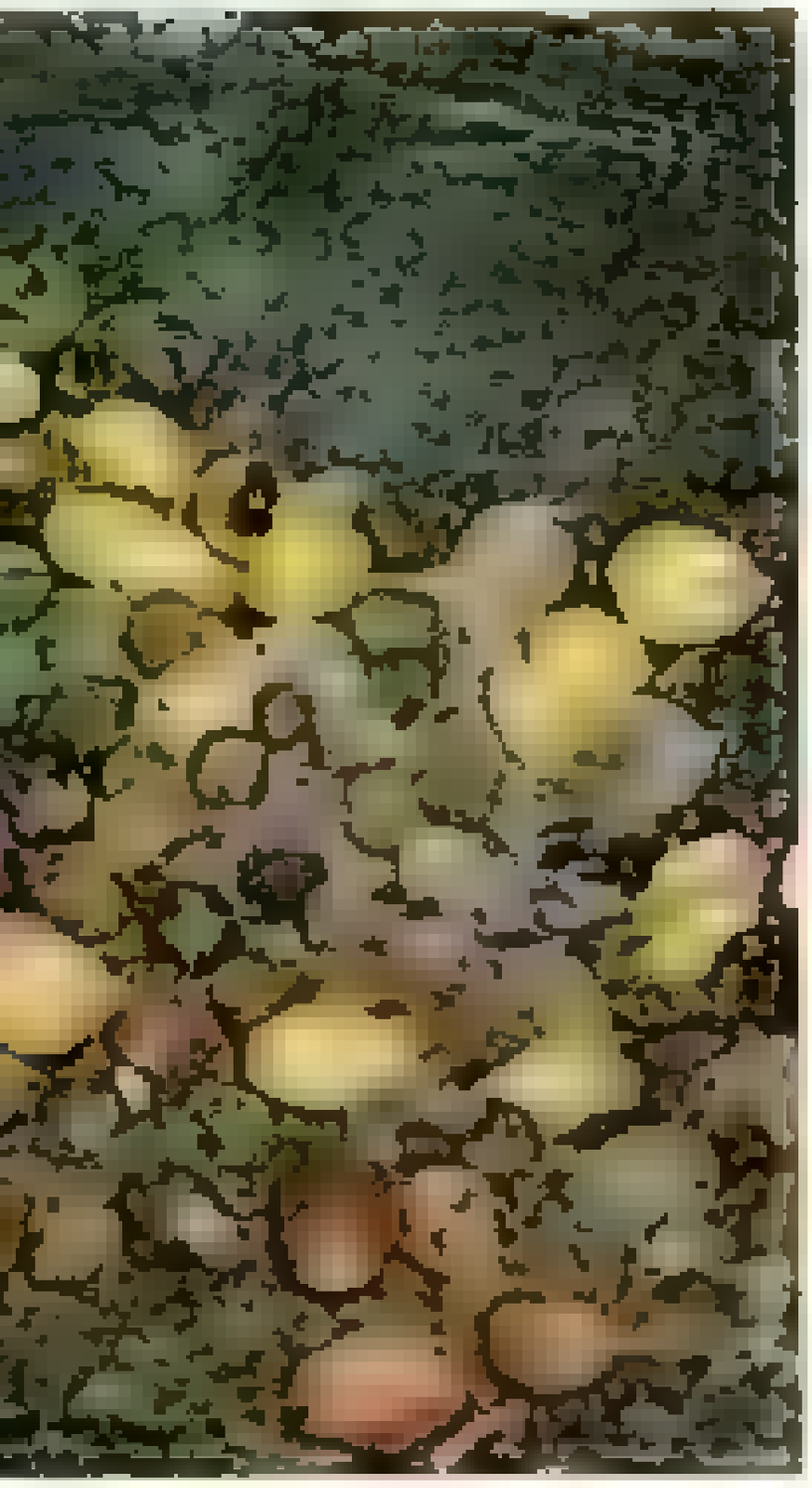


[illegible]

[illegible]

[illegible]

[



[illegible] The chasms were lined by [illegible] and [illegible] [illegible] have been recently protected. Many [illegible] erosion and [illegible] remained.

Invaluable results were [illegible] at a little distance, [illegible]

[illegible] of the accompanying photographs were made in an [illegible] [illegible] a small lens one was located in Grotto [illegible] at the [illegible] [illegible] Parks' nature trail, page 28[illegible]. The grotto has [illegible] never found in the same kind. There seem to be one species [illegible] it occupies a genus and family all its own in the order [illegible]

[illegible] proved [illegible] as the subject of [illegible] [illegible] [illegible] great [illegible] records [illegible] a few, often [illegible] separated cave homes [illegible] in Peru and Colombia to Venezuela, British Guiana, and [illegible]. Its [illegible] [illegible]

[illegible] in Darkness Brings a Near Tragedy

[illegible] the [illegible] we discovered in the Cave [illegible] [illegible] there seems little danger that its [illegible] [illegible] will be completely exterminated. [illegible] the [illegible]

[illegible] warning that it would [illegible] [illegible] outside the [illegible]. Apprehensively we began the descent of the [illegible] [illegible]. As we backed down [illegible] [illegible] short [illegible] Cliff, being the [illegible] [illegible] [illegible] the way I took the [illegible] [illegible] moved from crevice or crack [illegible] [illegible]

[illegible] the worst happened. Van Dyke's foot slipped down the steep [illegible] [illegible] [illegible] [illegible]

[illegible] "Watch out! [illegible]

I [illegible] to have a [illegible] with my left hand [illegible] [illegible] Van [illegible] quickly caught my extended right arm. Both of us were on the [illegible] [illegible] down the cliff [illegible] [illegible] and hanging [illegible] held [illegible] Van stopped.

Clark [illegible] Van's [illegible] to a [illegible] and [illegible] after painstaking [illegible] we [illegible] the rest of the way [illegible]

[illegible] the cave [illegible] [illegible] were [illegible] by the beauty of a great forest tree [illegible] [illegible] We [illegible] as prisoners [illegible] [illegible] [illegible]

[illegible] one day wait for the event [illegible] [illegible] [illegible] [illegible] Already at 5:30 the birds were stir[illegible] [illegible] [illegible] A [illegible] light [illegible] [illegible] a few darted [illegible] the cavern as if to test the [illegible] and then returned. Then emergence began [illegible] [illegible] as well as great numbers [illegible] the [illegible] began to leave the cave en masse, [illegible] [illegible] for a full half hour [illegible] [illegible] streams of birds passed out [illegible]. As soon as they were clear of the cave entrance the [illegible] chirps ceased, and the birds became [illegible] [illegible] [illegible] over the forest.

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COVER: [illegible] pages 154-5

NATIONAL GEOGRAPHIC MAGAZINE

This is the fabulous new Knorr Chicken Noodle Soup—the only kind that tastes like you made it yourself. Knorr uses plump little chunks of chicken, crisp garden vegetables, tender egg noodles, and, of course, Knorr's famous European seasoning secret. Now in one minutes you can serve the kind of chicken noodle soup it would take hours to make yourself. Soup with uncanny flavor!

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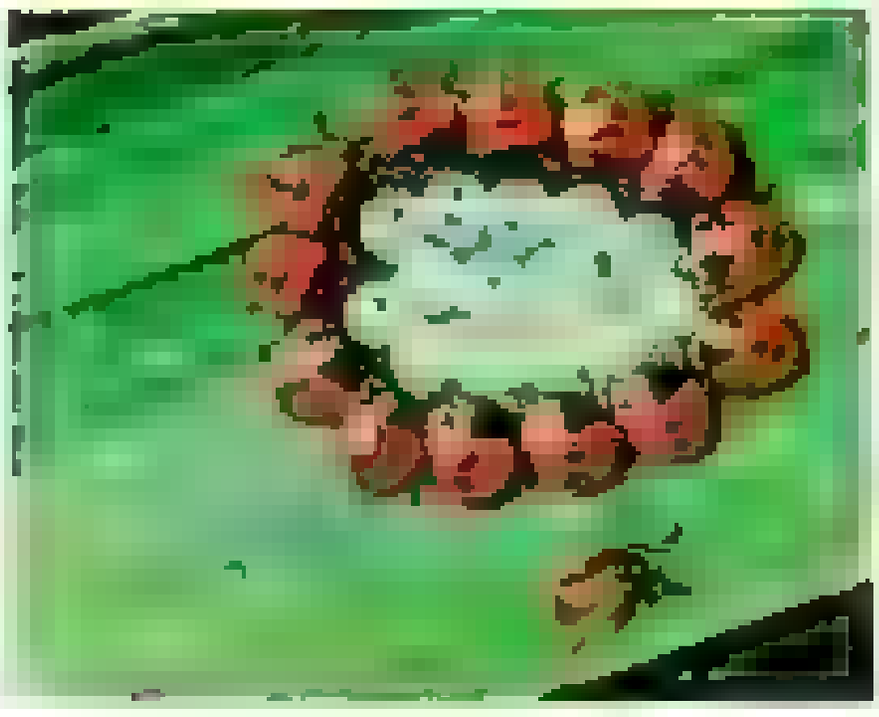

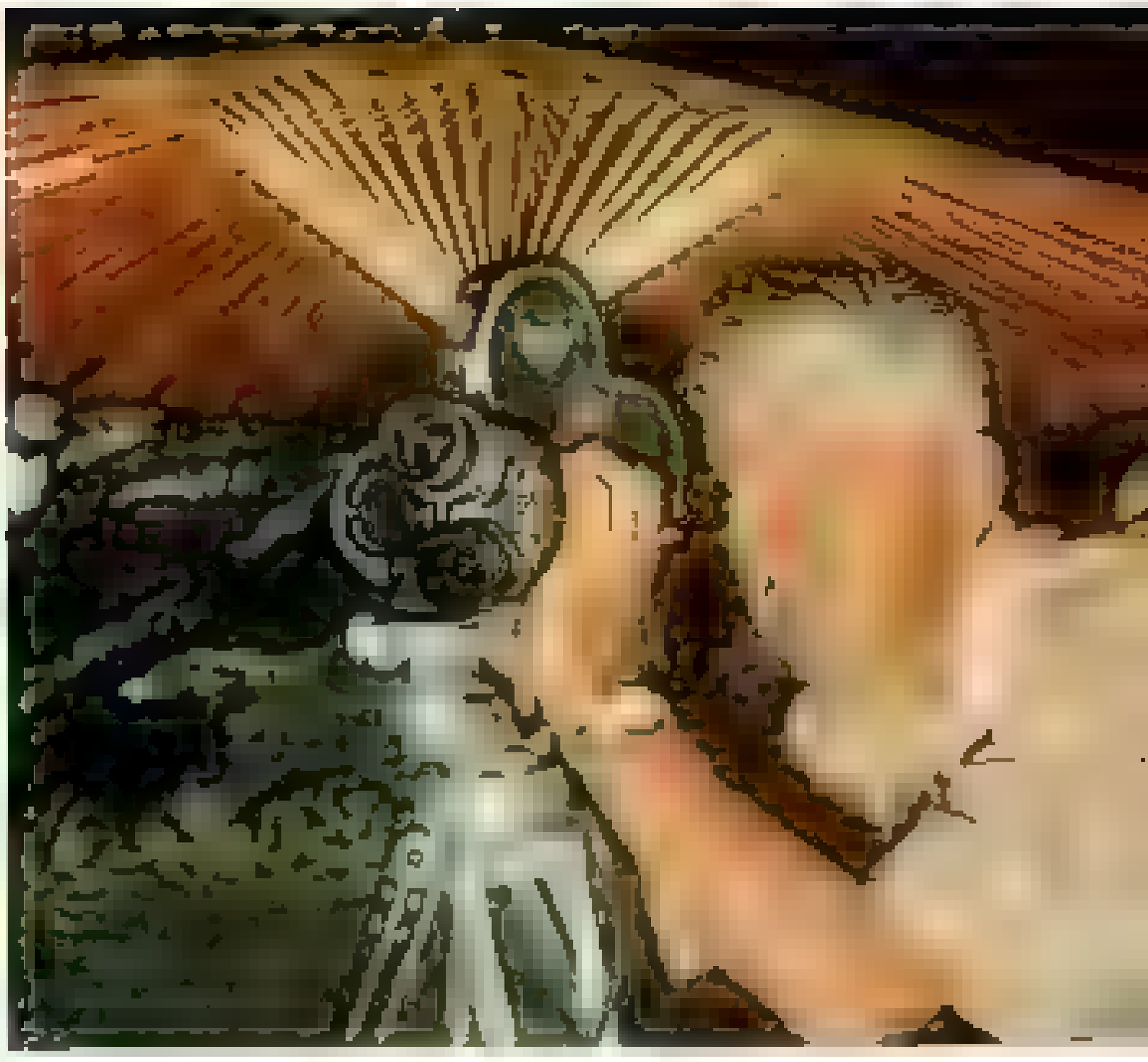

Strange safari stalks the Orient for rare insects

HUNTING IN SOUTHERN ASIA, Dr. Edward S. Ross [illegible] armed himself with nets, tweezers, bottles, boxes, and cameras. His catch: half a million insects and arachnids taken alive and on film.

Aided by a National Geographic Society research grant, Dr. Ross recently covered 24,000 miles through India, Pakistan, and Southeast Asia. He [illegible] spider [illegible] [illegible] from which they obtain a supply of the [illegible] for digestion of plant juice.

During similar collecting expeditions in South America, [illegible]

NATIONAL GEOGRAPHIC SOCIETY MEMBERSHIP

$6 50 CALENDAR YEAR 1965 MEMBERSHIP DUES INCLUDE SUBSCRIPTION TO THE NATIONAL GEOGRAPHIC.

I NOMINATE [illegible]

GIFT MEMBERSHIP [illegible]

I DESIRE INFORMATION [illegible]

THE SMALLER THE BETTER NEW DIMENSIONS IN CONVERSATION

In the eye of a needle above is a transistor switch that can turn on or off in ten billionths of a second. It is an example of the micro-miniature devices that Western Electric makes today for the new Electronic Switching Systems now being put into service in the Bell telephone network. Life-size, the unit shown is scarcely larger than the period that ends this sentence.

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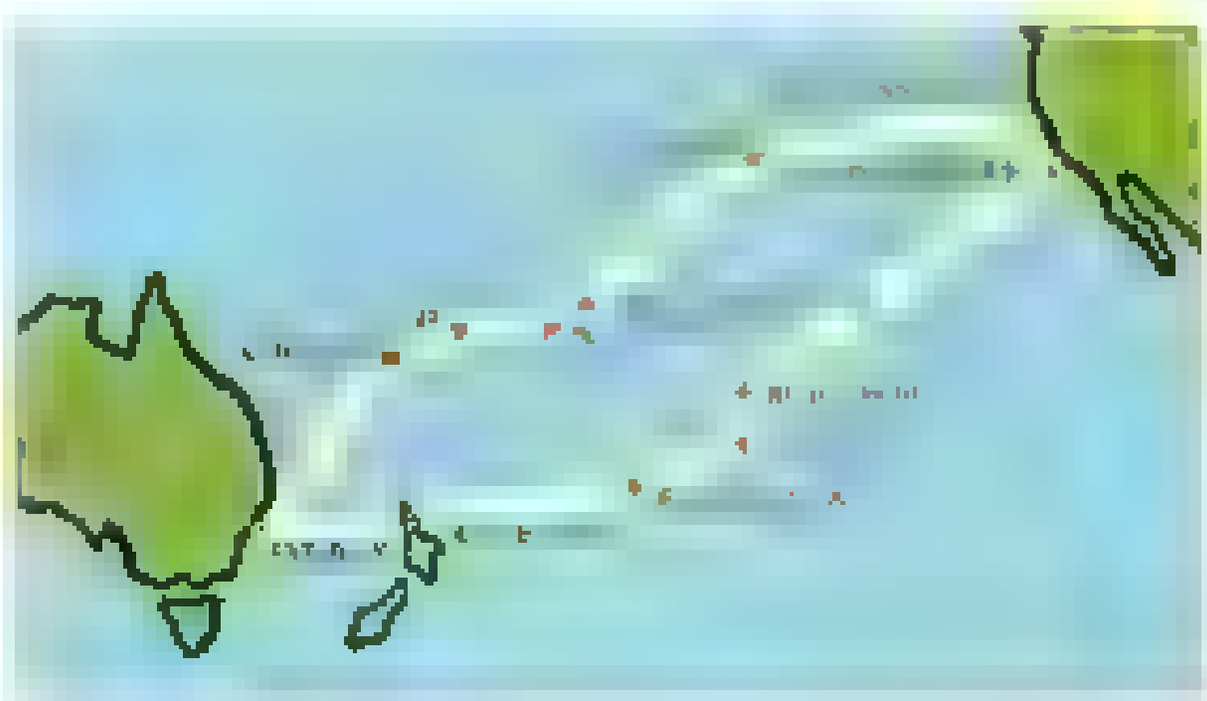

How to airlift heavy, highest priority loads to aircraft carriers at sea . . . .

[illegible] aircraft that will carry sufficient cargo to [illegible] a maximum range of [illegible] over 300 miles per hour [illegible] ft and land on aircraft carriers running [illegible] at sea and [illegible] on board with [illegible] ft wrest [illegible] spot [illegible] 30 feet.

The C-2A was recently selected by the U.S. Navy for the thirty-year Grumman aircraft to be specifically designed for service use. And the 24,000th aircraft produced for the U.S. Navy by Grumman.

Grumman has been a partner with the Navy for many years, and for decades. Today, Grumman activities have expanded into projects which span the scientific spectrum and as always, Grumman [illegible] the right [illegible] transforming advanced ideas into reality.

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[illegible]

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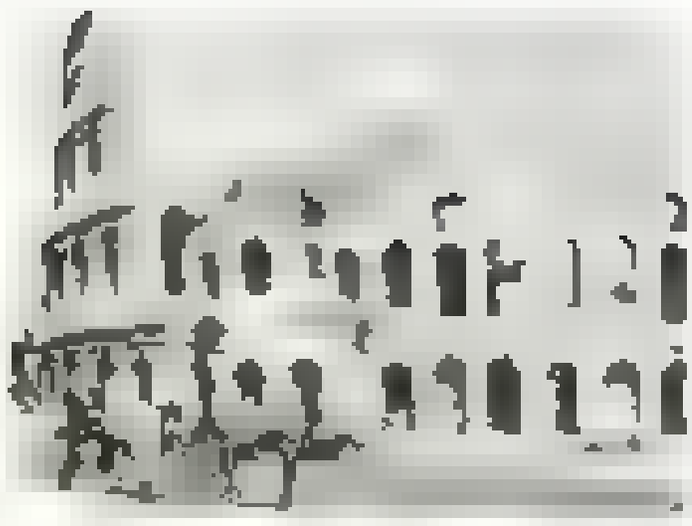
The Accutron tuning fork divides every second into 360 equal parts.

[illegible]

[illegible] heads up, tucked [illegible] breathe harder [illegible] the driver. Wait [illegible]

[illegible]

[illegible]



Ill.

Way out.

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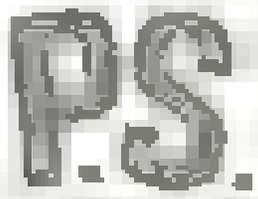

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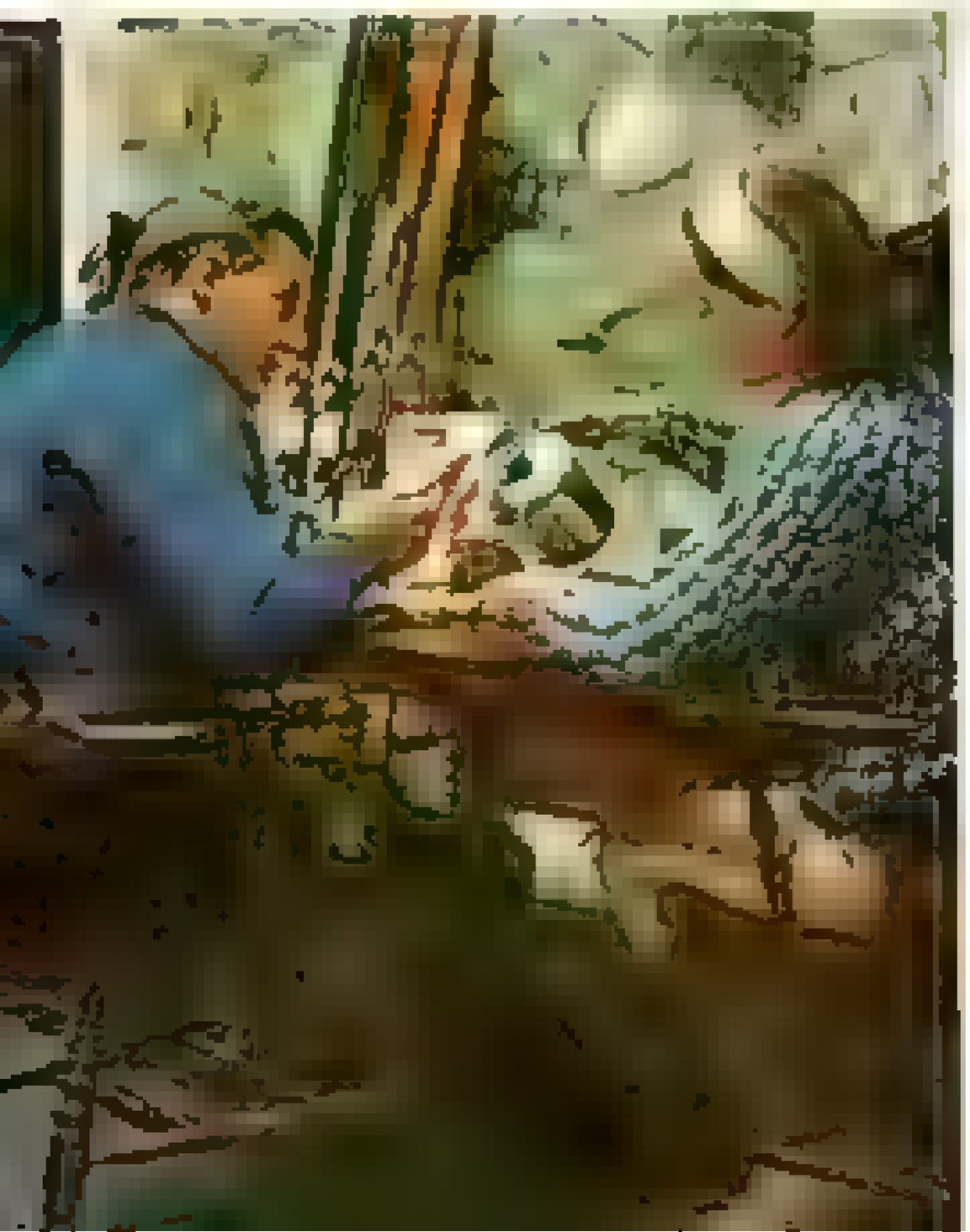

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[illegible] to take care

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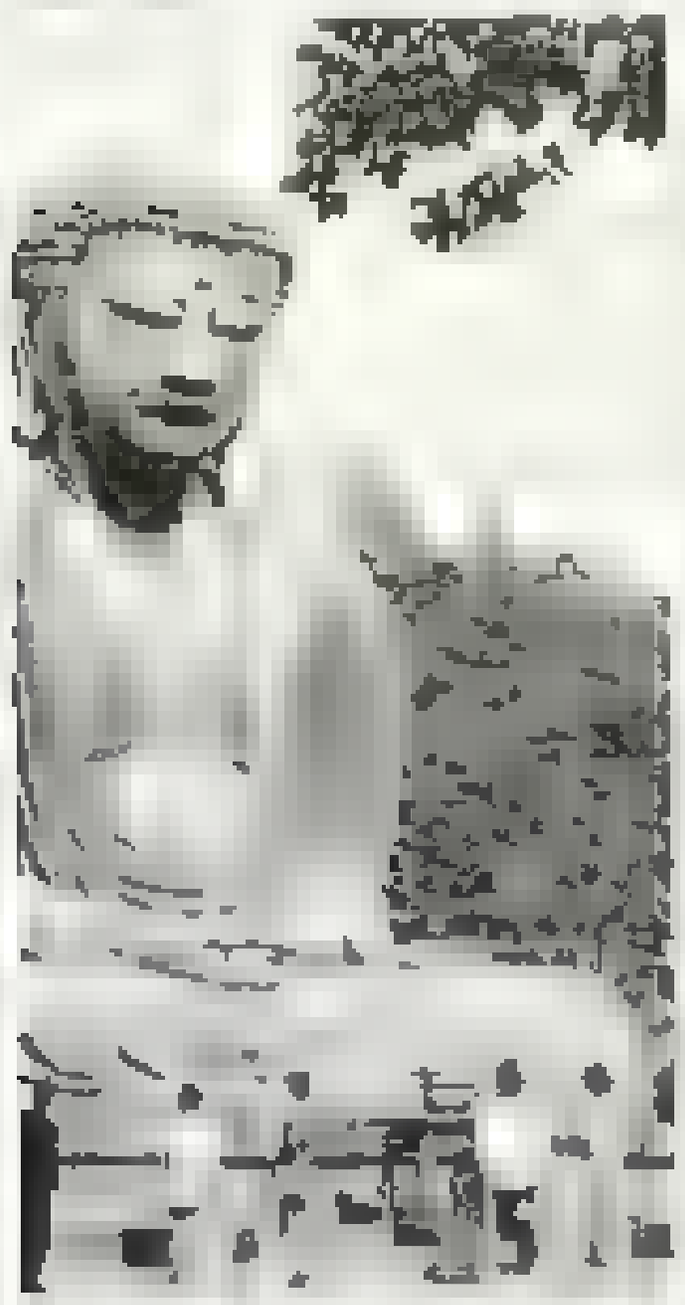
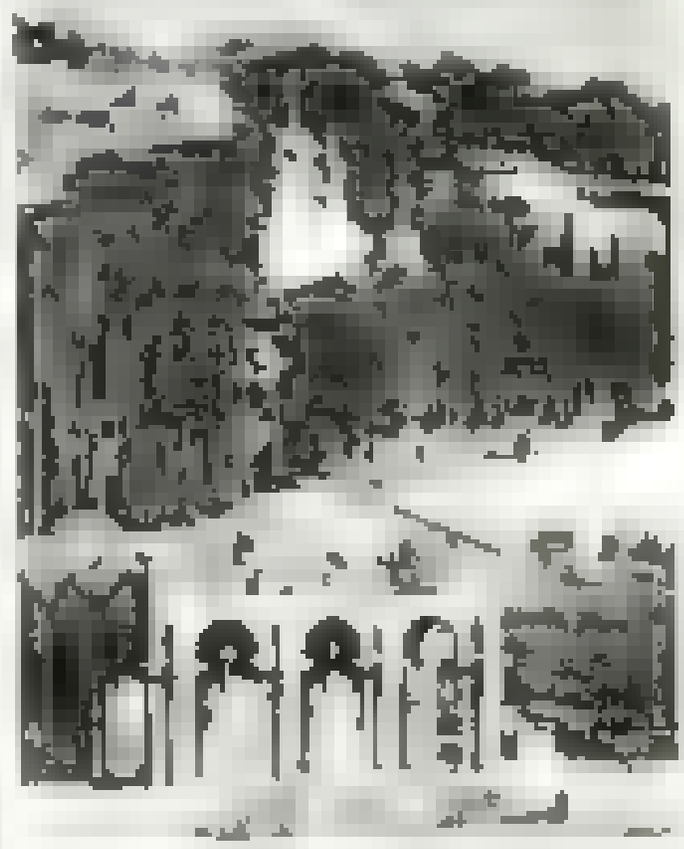
Middle Eastern Budget Cruise [illegible]





[illegible]

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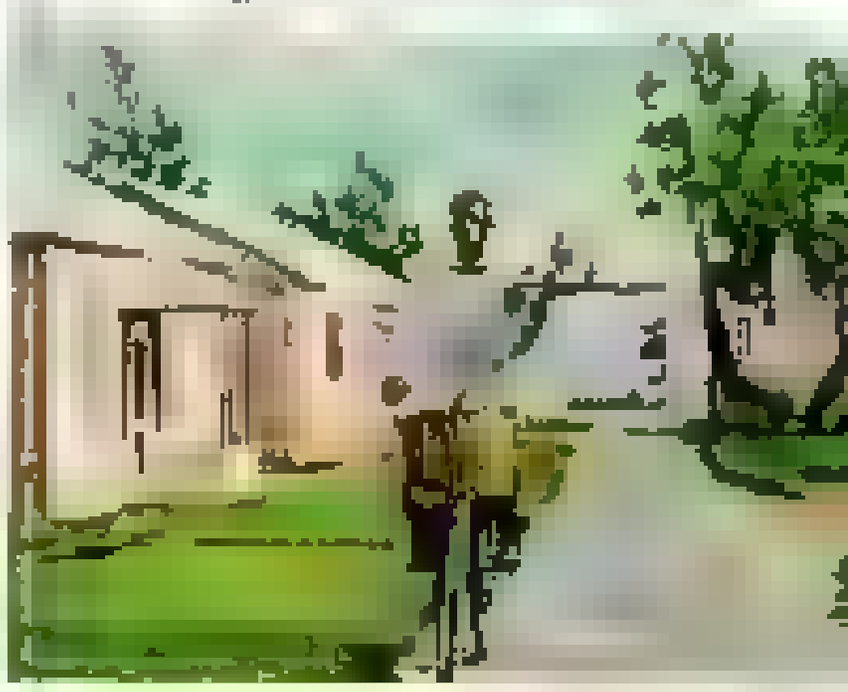

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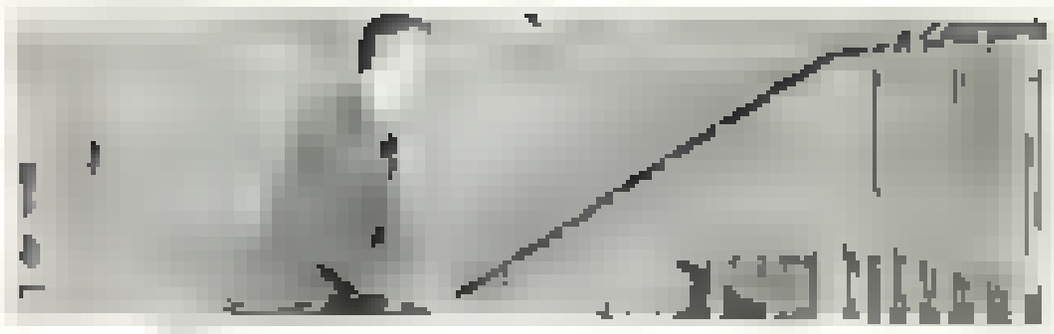

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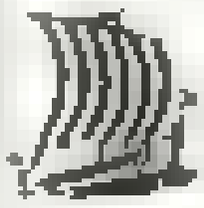

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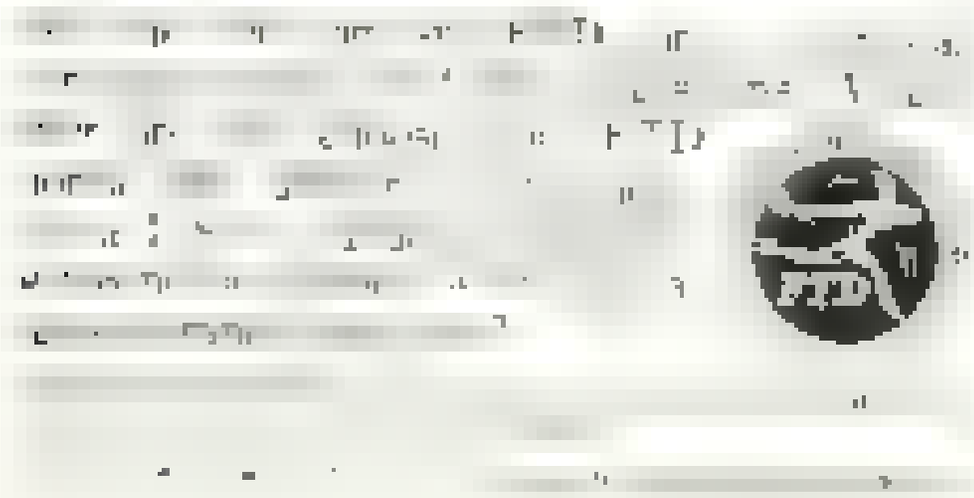

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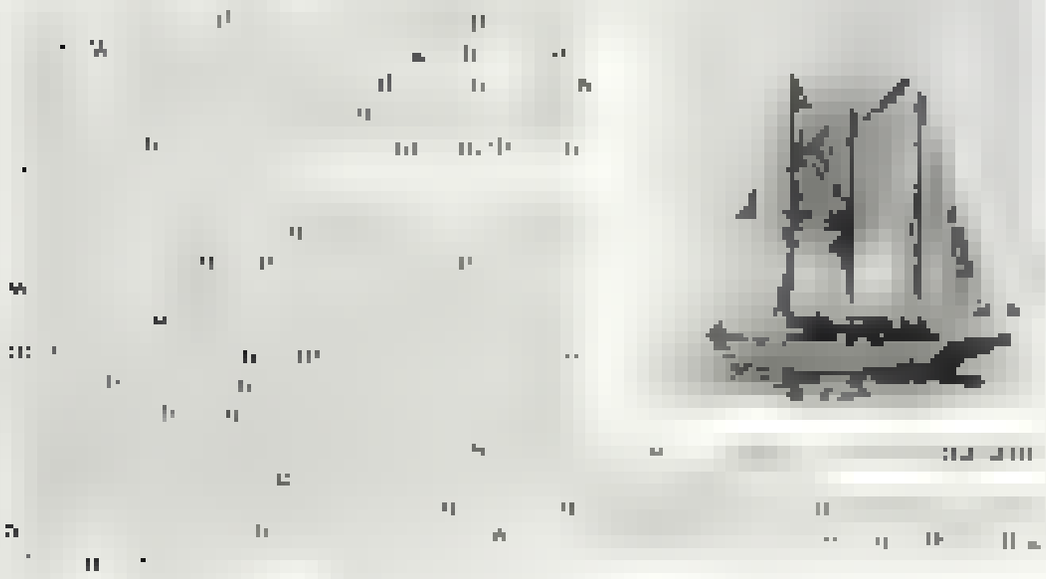

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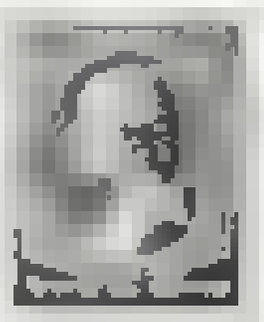

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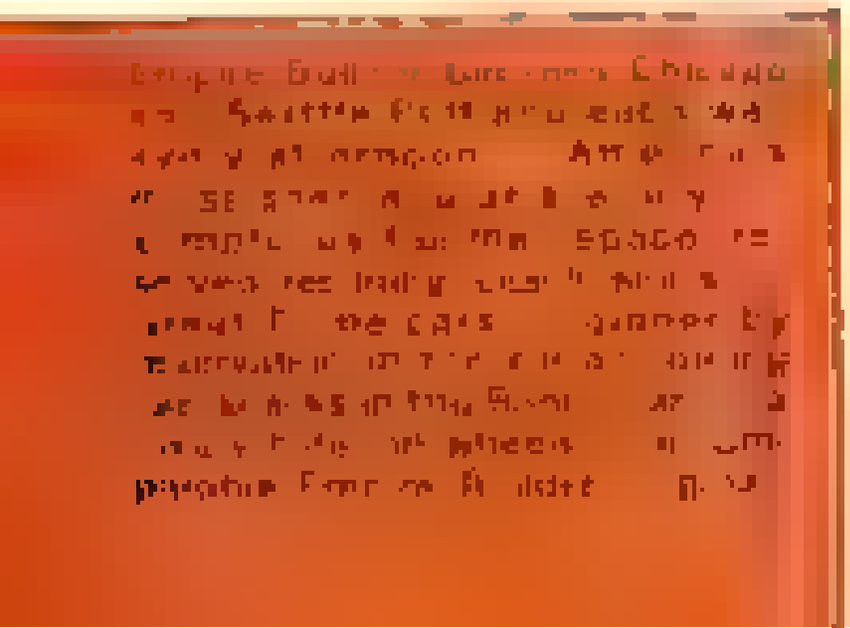

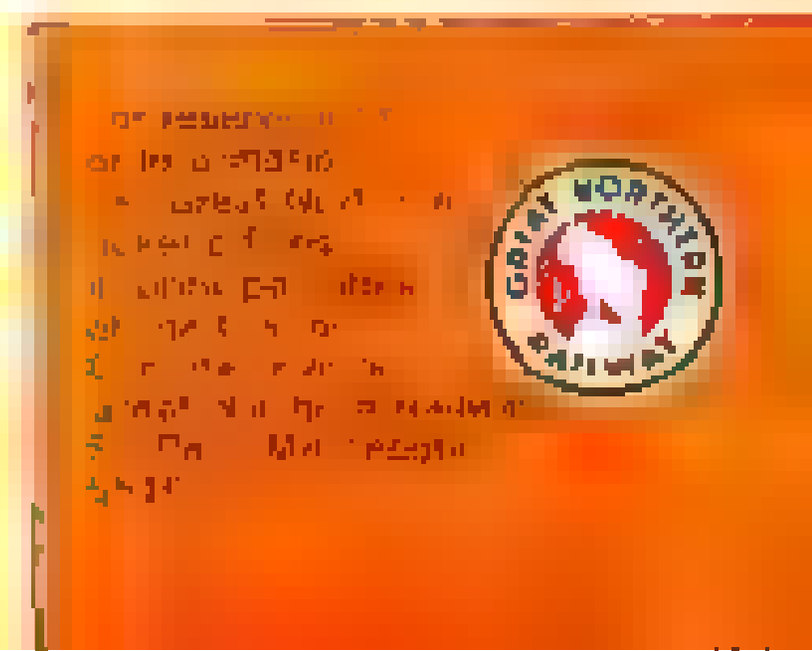

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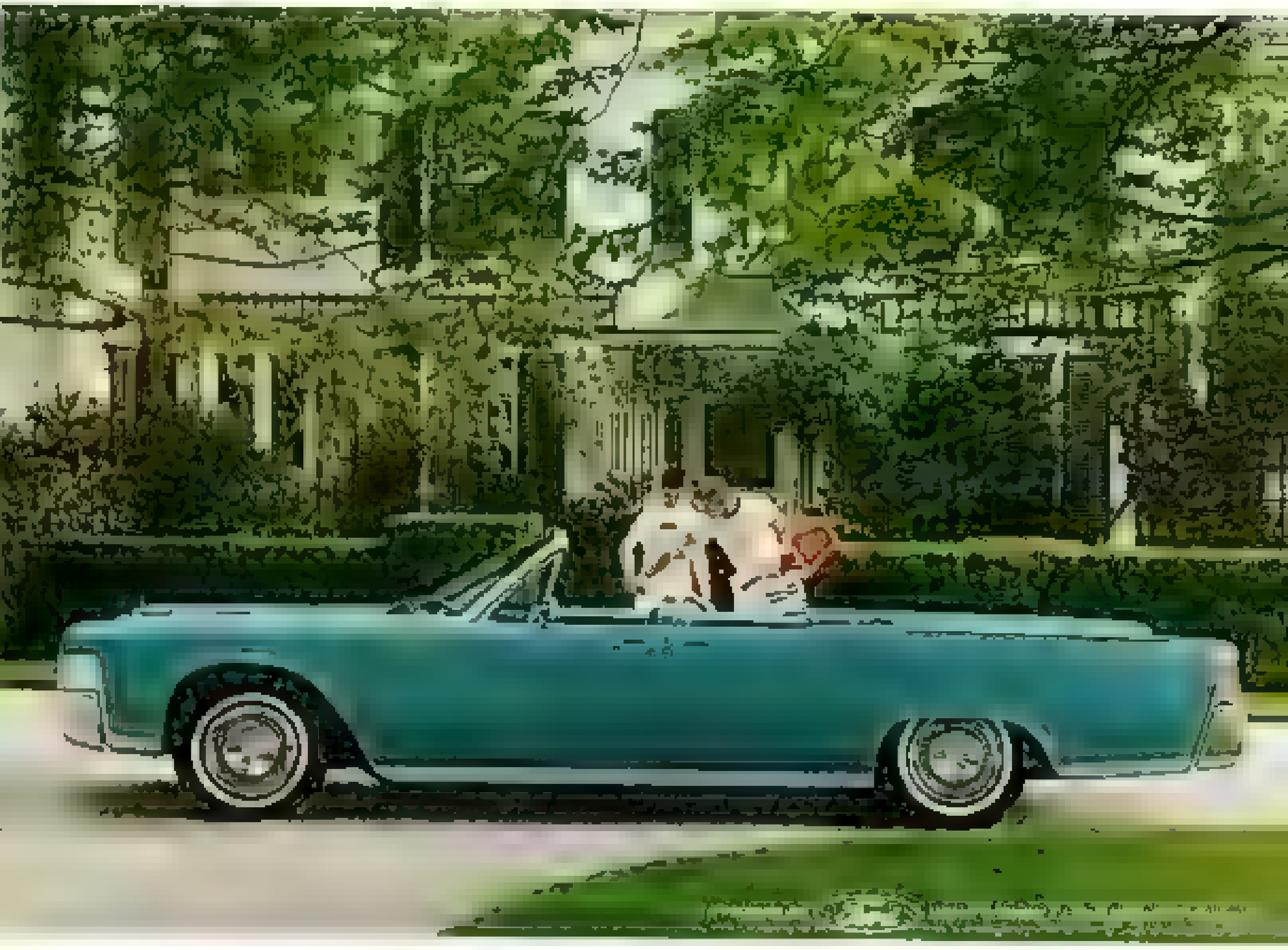

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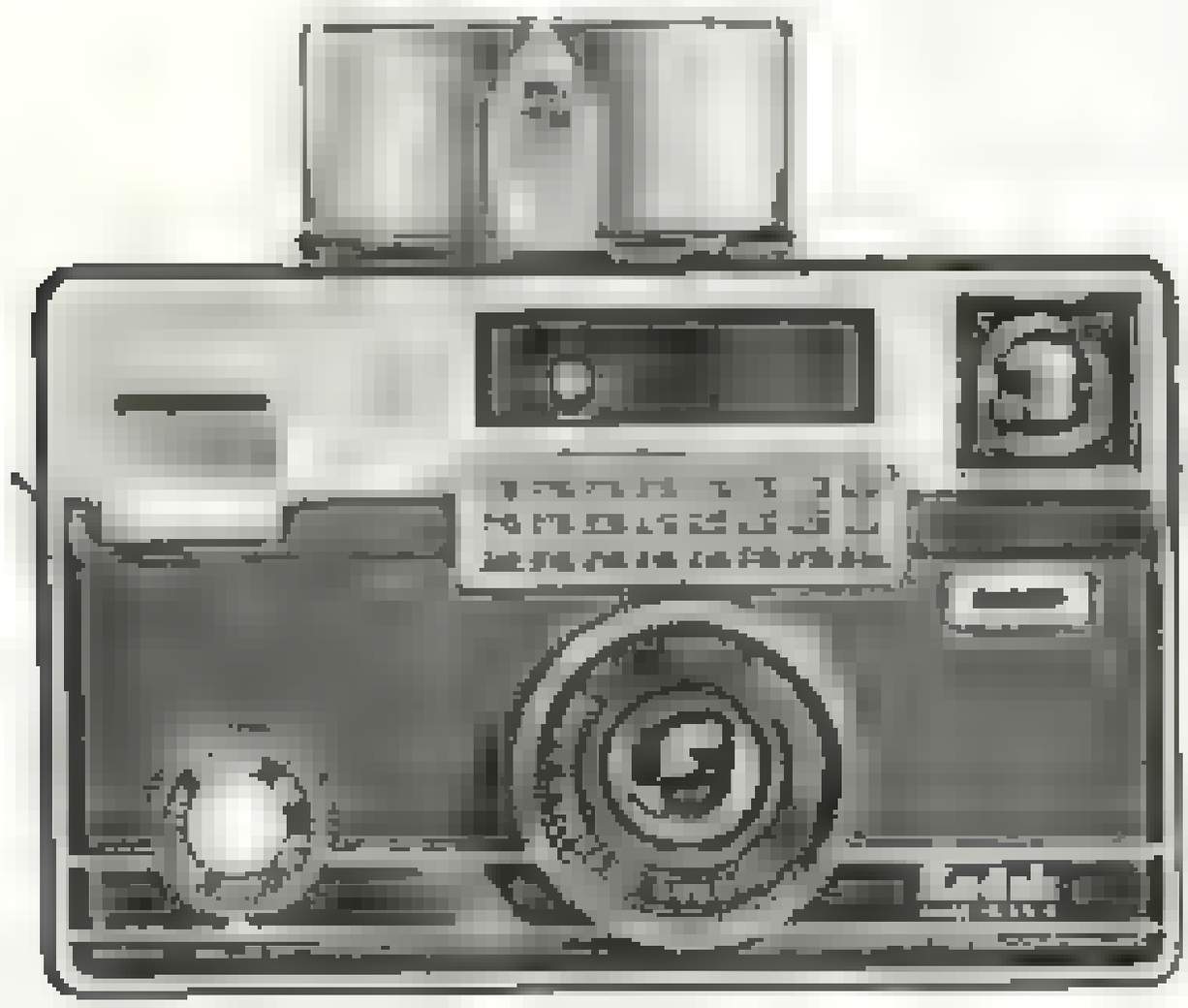

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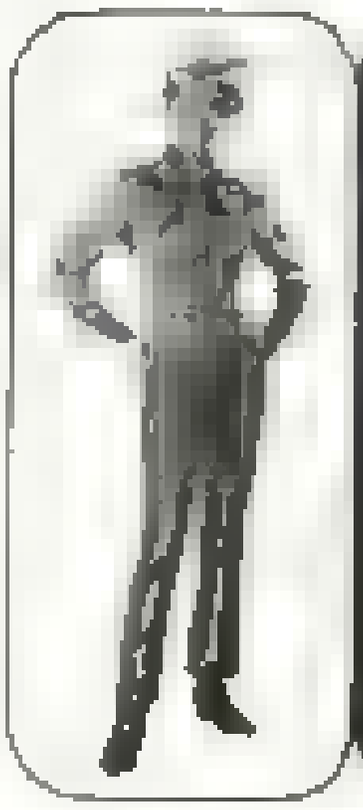

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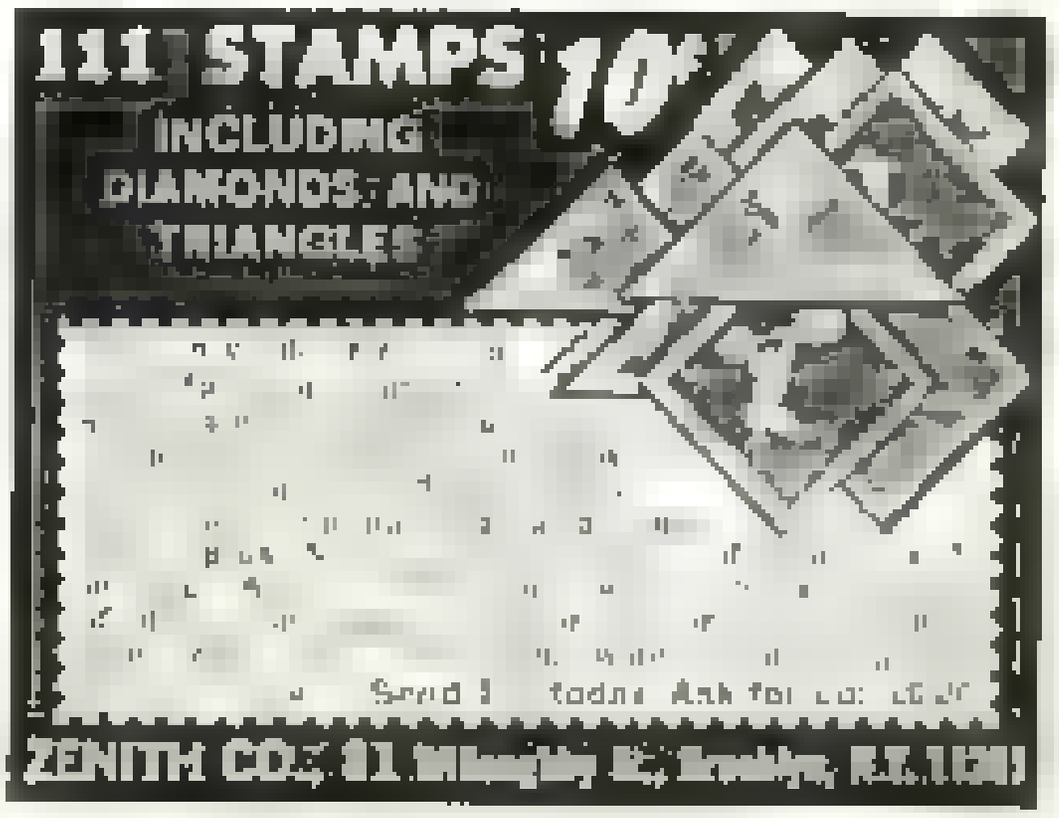

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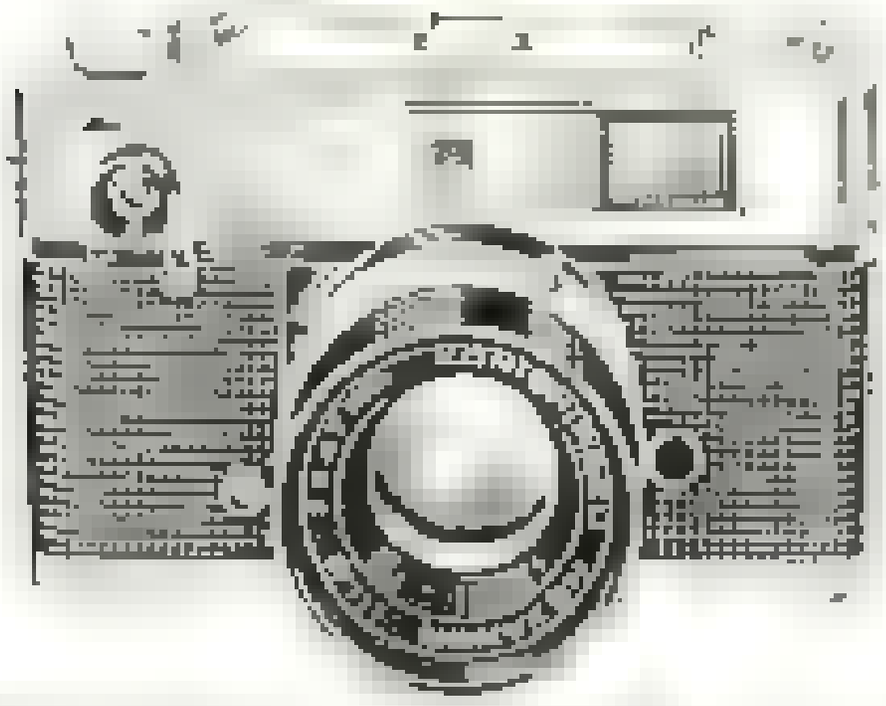

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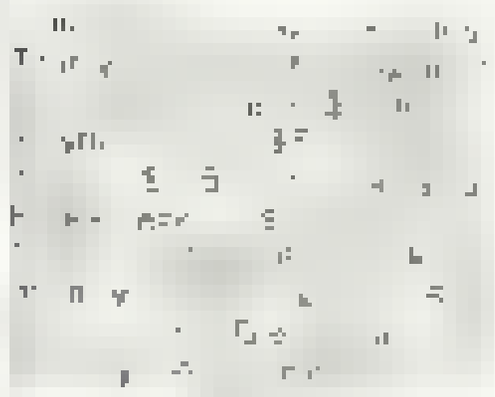
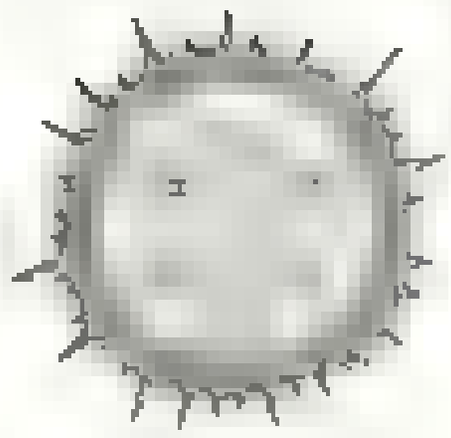


think sun... think fun!



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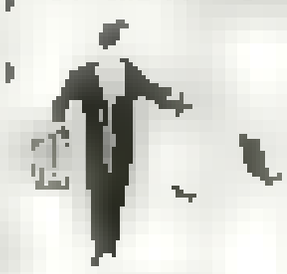

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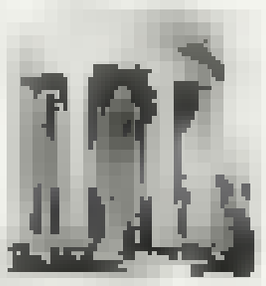

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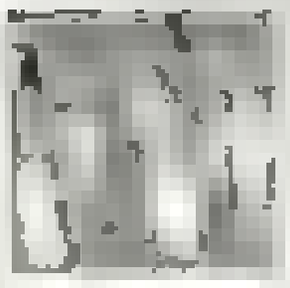

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